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Title: Decision Paper for the Disposition of FS-65 Shipping Containers,
Support Equipment, and Mixed Oxide (MOX) Material Contents (Rev. 1.1)

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**Decision Paper for the Disposition of FS-65 Shipping
Containers, Support Equipment, and Mixed Oxide
(MOX) Material Contents (Rev. 1.1)**

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1.0 Background and Summary

1.1 Background

There are two FS-65 shipping containers containing MOX fuel staged in the basement of the Plutonium Facility (PF)-4, TA-55. There are also four empty FS-65s and various sub-components stored in several cargo containers outside of the protected area. The FS-65s and contents require routine surveillance and take up valuable PF-4 space so removing them is a LANL priority. The FS-65 was licensed in France and the Department of Transportation (DOT) and Nuclear Regulatory Commission (NRC) approved its use for a one time import of the fuel assemblies from France. The shipping containers need to be licensed as Type B shipping containers in the US or excessed.

The two FS-65 containers in PF-4 hold fresh (i.e., not irradiated) MOX reactor materials. One FS-65 contains individual fuel rods in a rod box. The other FS-65 contains fuel rods in a fuel assembly, referred to as the Excess Material Assembly (EMA). The material is excess from the manufacture of four lead test assemblies in France as part of the NNSA plutonium disposition program. There is value in the MOX contained in the two FS-65s for the DOE MOX Program. The programmatic intent for the bulk of the material is to be shipped to the Savannah River Site (SRS) MOX fuel fabrication facility (MFFF) for use as feed material. The MFFF is presently scheduled for hot operational start-up in 2015. There is also interest in receiving eight of the rods (currently stored in the rod box) at Oak Ridge National Laboratory (ORNL) earlier- in 2013-2014, for several programmatic needs, including calibration of fuel rod scanning equipment.

The remaining excess fuel rods will be stored at SRS until startup of the MFFF. It is expected that MOX Services will gain a material possession license for the MFFF in June, 2015, coinciding with the early start date for hot start-up. Based on input from personnel at the SRS MFFF, the use of the excess rods will save approximately six months calendar time compared to the alternative of SRS fabrication of new pellets and rods.

The extra material can be recycled as scrap and fed into the process to make new fuel pellets. The MFFF blending process works better with some fraction of recycled pellets. All the MOX material can ultimately be disposed of as reactor fuel.

This decision paper provides a summary of 2 alternatives and associated rough order of magnitude cost and schedule durations (Attachment 1) for transfer of the FS-65's and contents from LANL to the MFFF at SRS. In both alternatives the 8 specified individual fuel rods will be removed and transferred to Oak Ridge National Lab in association with the FS-65 shipment to SRS. The 2 alternatives are:

Alternative 1- Remove the 8 Sample Rods at ORNL

- Both of the FS-65s are removed from the Plutonium Facility and loaded onto SSTs (or onto commercial carriers if approved by NNSA/DOE/DOT).
- The FS-65 containing the EMA is shipped directly to SRS, where it is unloaded from its carrier.
- The FS-65 containing the rod box is shipped to ORNL.
- The FS-65 is removed from its carrier, and the rod box is removed from the FS-65.

- The eight rods are removed from the rod box and replaced by dummy rods prior to shipping the remaining material in the FS-65 to SRS, where the FS-65 is unloaded from its carrier.
- LANL staff provides FS-65 handling at both SRS and ORNL and rod box handling at ORNL.

Alternative 2- Remove the 8 sample Rods at LANL

- The FS-65 containing the EMA is removed from the Plutonium Facility and loaded onto an SST (or onto a commercial carrier if approved by NNSA/DOE/DOT). It is shipped directly to SRS, where it is unloaded from its carrier.
- The FS-65 containing the rod box is unloaded at LANL, and the eight rods are removed from the rod box and replaced by dummy rods.
- The eight rods are loaded into a rod canister for a NAC LWT shipping package. The canister is loaded into the LWT, and the LWT is shipped via commercial shipment to ORNL.
- The rod box is placed back into the FS-65, which is loaded onto an SST (or onto a commercial carrier if approved by NNSA/DOE/DOT) and shipped to SRS, where the FS-65 is unloaded from its carrier.
- LANL staff provides FS-65 handling at SRS.

1.2 Summary

A description of the containers, contents, and disposition alternatives follow. Table 1 provides a rough order of magnitude cost and schedule duration estimate for the 2 disposition alternatives. Cost and schedule data are rounded to two significant figures and the durations are based on 1735 working hours per year. The sub-task durations and personnel are not totaled for the tasks because many of the sub-tasks will be conducted in parallel. Once an Alternative is selected a detailed resource loaded schedule will be developed.

Table 1. MOX Fuel and Container Disposition- Cost and Schedule Summary

Task	Activity Description	Cost (\$k)	Activity Duration (Months)
	Alternative 1- Eight Sample Rods Unloaded at ORNL from FS-65		
1.1	FS-65 Transportation Exemption Request	200	5.6
1.2	Equipment Acquisition	850	14
1.3	FS-65 Packaging and Transportation Readiness	1200	16
1.4	Packaging and Transportation Pre- Shipment Activities	1100	10
1.5	Perform Shipment- FS-65's	2400	11
1.6	Disposition of the Remaining 4 Excess FS-65s and Associated Sub-components from 11 LANL transportainers	370	4.8
	Alternative 1 Total	6100	
	Alternative 2- Eight Sample Rods Unloaded at ORNL from LWT		
2.1	FS-65 Transportation Exemption Request	200	5.6
2.2	NAC-LWT Transportation Request (for 8 rods)	180	4.9
2.3	Equipment Acquisition	1100	19
2.4	FS-65 Packaging and Transportation Readiness	1200	16
2.5	NAC-LWT Packaging and Transportation Readiness	1000	17
2.6	Packaging & Transportation Pre-Shipment Activities	1700	21
2.7	Perform Shipment- FS-65's & NAC-LWT	2600	12
2.8	Disposition of the Remaining 4 Excess FS-65s and Associated Sub-components from 11 LANL transportainers	370	4.8
	Alternative 2 Total	8400	

The Alternative 1 estimate does not include the costs at ORNL of offloading the rod box from the FS-65, removing the 8 rods, replacing them with dummy rods, and then shipping the remaining material in the FS-65 from ORNL to SRS. Alternative 2 involves repackaging the FS-65 contents at LANL into a licensed NAC-LWT shipping container so the Alternative 2 cost reflects a \$2.3 M increase over Alternative 1 associated with LANL personnel training and repackaging activities.

There are uncertainties associated with both Alternatives that are generally administrative. The burden is gaining the licensing authority to ship the FS-65's. The primary risks associated with Alternative 2 involve the fit of the FS-65 inside the facility and the orientation of the NAC-LWT outside the facility to support loading of the NAC-LWT. The repack room dimensions necessitate horizontal unloading of the FS-65. It will be necessary to flange up the NAC-LWT with TA-55 at the exterior door to manipulate the loading. This is the most likely loading orientation. If that orientation is not workable due to physical constraints then there is an authorization basis issue associated with staging the NAC-LWT outside the north door and rolling a cart loaded with the rods and fuel assembly, after removal from the FS-65, outside the building to be loaded into the NAC-LWT. Given the form of the material and the low MAR associated with sintered, clad fuel pellets, this should not be a difficult safety case, however, the increased costs associated with the outside loading are not included in the estimate.

2.0 Container and Material Description

2.01 FS-65s

A schematic (Figure 1) and photograph (Figure 2) of the FS-65 shipping package and container are attached. The present inventory at LANL is:

- Two FS-65 shipping containers in PF-4, containing the MOX materials that were decontaminated before packaging. The Department of Transportation (DOT) requires that they are placarded as radioactive.
- Four empty FS-65 shipping containers located in two of nine cargo containers at LANL that contain spare FS-65 equipment. The 4 FS-65's were not checked for internal cleanliness after the MOX lead assemblies were unloaded at Catawba. They were checked to confirm that they were empty, and then they were closed up and tamper indication seals were applied.
- Associated radioactively cold support equipment stored in the nine cargo containers at LANL

One FS-65 contains the fuel pellets in individual rods within a rod box. The other FS-65 contains the fuel in the form of a reactor fuel assembly. Based on DOE M 474.1-1B, each FS-65 contains a Safeguards and Security Category III quantity of attractiveness level D plutonium. The combined quantity of the fuel assembly and rod box is a Category II quantity (Reference 1).

The filled FS-65 containing either the fuel assembly or the rod box weighs approximately 6.3 tons. The FS 65s are stored horizontally as received in PF-4. Technical Area (TA) 55 personnel performed annual maintenance on each FS-65 until the implementation of Technical Safety Requirements (TSR) 6.1 approximately 2 years ago. During this maintenance, TA-55 personnel removed the shock absorber, fastening ring, and plug to expose the rod box or fuel assembly. They replaced the plug o-rings and then

reassembled the FS-65. In accordance with Safeguards requirements only one FS-65 was open at any particular time. The lapse of the FS-65 certification removed the requirement for annual maintenance and the practice was reduced to an annual contamination smear of the exterior flange. Presently, personnel perform annual material at risk (MAR) calculations based on the following TSR 6.1 requirement:

“The MAR inventory for storage of mixed oxide fuel in the basement SHALL be limited to 300 kg 239Pu equivalent.”

2.02 MOX Fuel Rod Box

One FS-65 contains an AA-433 fuel rod box (Figure 3). Photographs (Figures 4 through 6) show the rod box on the rod box table and as it was loaded into the FS-65 for shipment to LANL. The rod box contains the following (Reference 2):

- A body made up of a stainless steel sheet (thickness 1.5 mm) in the form of a U reinforced by 16 U-bolts along the entire length, the volume between U-bolts being occupied by stiffeners in aluminum alloy; top and bottom stainless steel plates close this body
- A lid, made up of a stainless steel sheet (thickness 1.5 mm), hinged on the body using 4 hinge pins and closed by 14 toggle fasteners and hooks, with three stainless steel U reinforcements
- An internal furnishing consisting of silicone skids on skid supports in stainless steel and two axial adjustable tightening devices at the top and bottom of the body, which connect to the top and bottom plates of the fuel rods box
- Sixteen rollers on the lower surface of the fuel rods box enable the insertion and retraction of the box from the basket

The fuel is in the form of compressed, sintered pellets of a mixture of PuO_2 and depleted UO_2 (U-235<0.3%) contained in zircalloy-clad fuel rods. The detailed rod box inventory is provided in Attachment 2. The concentration of Pu, primarily nuclides Pu-239, Pu-240, and Pu-241, in the fuel rods ranges from 2.4% to <5%, with the majority of the fuel rods at the highest concentration. Fuel rod box parameters are as follows (References 1 and 3):

- Filled rod box weighs 1470 pounds (666.8 kg)
- Total rod box Pu content of 13.9 kg Pu in 170 MOX rods
- Individual rod clad OD equals 0.374 inches
- Pellet diameter measures 0.3225 inches
- Mass is 1.75 Kg Heavy Metal per rod
- Actual Pu loadings in the rods are 2.4, 3.3, and 4.94 weight percent Pu; uranium oxide at 0.25% U-235
- Table 2 estimates the dose from a single fuel rod (Reference 6)
- The gross weight of each fuel rod measures 5.3 pounds (2.4 kg) and the stack weight of the fuel pellets at 4.4 pounds (2.0 kg)
- 170 MOX rods and five (5) stainless steel dummy rods.

The fuel pellets were sealed in fuel rods and placed in the fuel assembly or rod box. The fuel assembly or rod box was inserted into the FS-65 container. A special table equipped with a conveyor belt device was used for insertion of the rod box and this equipment could be used at LANL for removal of the rod box. The equipment would have to be brought in from France, if it is still available. If the equipment is not available, and since the box has rollers, perhaps a winch could be used to extract the box onto a table. An alternative would be to pull the rod box out on to a strongback, which would be equipped with wheels to roll the loaded strongback to a table on which the rod box could be set. The same strongback could possibly be used to roll the loaded LWT rod canister to the north door for loading into the LWT. The FS-65 container is closed with a 500 pound shock absorber, and a fastening ring and plug that require a special tool for opening (Figure 4).

**Table 2. Dose Rate from Side of a Single Fuel Rod (5% Pu in MOX) from MCNP
(Data circa February, 2006)**

Distance (cm)	Neutron Dose (mrem/hr)	Photon Dose (mrem/hr)	Total Dose (mrem/hr)
0	1.975E-01	7.363E-01	9.338E-01
10	4.357E-02	1.593E-01	2.029E-01
20	2.759E-02	1.037E-01	1.313E-01
30	2.142E-02	8.117E-02	1.026E-01

2.03 MOX Fuel Assembly

One FS-65 contains a fuel assembly (Figures 7 and 8). The fuel assembly contains a total of 14.3 kg Pu in 264 MOX rods. The detailed fuel assembly inventory is provided in Attachment 2. The fuel assembly weighs 1479 pounds (671.5 kg) and is approximately eight inches square by approximately 13.3 feet long.

3.0 Disposition of FS-65s and Contents

3.1 Extraction, Packaging, and Shipment of the Eight Special Fuel Rods to ORNL

There is interest in receiving eight of the fuel rods from the rod box at Oak Ridge National Lab (ORNL). One of the 8 rods is a calibration rod containing 3 Pu loadings. One of the 3.3% rods is for a special use. The remaining 6 rods are archive rods, 2 of each Pu loading. The archive rods are needed at ORNL to support the PIE of the MOX lead assemblies. The plan would be to transport a batch of 8 rods from LANL to ORNL consisting of the following:

- One calibration rod containing three Pu loadings
- Two 2.4% Pu rods
- Three 3.3% Pu rods
- Two 4.94% Pu rods

Table 3 provides the specific eight rods, their position in the rod box, and the French and US rod numbers and Table 4 provides individual rod isotopics.

Table 3. Required Eight Rods- Configuration

Position in Rod Box			French Rod Number	US Rod Number	Pu Content (%)	MFFF Req't (Intact or Pellets)	Description
Bundle	Row	Position					
1	1	6	10017151	299317151158	2.4	Intact	Low Pu rod for MFFF
1	2	6	20025328	299325328153	all 3	Intact	Gamma scan rod for MFFF
1	2	7	30005192	299305192156	4.94	Intact	High Pu rod for MFFF
1	2	8	30005070	299305070157	4.94	Pellets	High Pu archive rod for removal of pellets
1	2	10	20027114	299327114150	3.3	Pellets	Medium Pu archive rod for removal of pellets
1	2	11	20027157	299327157157	3.3	Intact	Medium Pu rod for MFFF
1	2	12	20027192	299327192158	3.3	Intact	Medium Pu rod for IAEA
1	2	13	10017159	299317159154	2.4	Pellets	Low Pu archive rod for removal of pellets

Table 4. Required Eight Rods- Composition (Reference 6)

	Mass in grams (June 1, 2005)									
	Oxide	U	U-235	Pu+Am	Am	Pu-238	Pu-239	Pu-240	Pu241	Pu-242
Low Pu rod for MFFF	2007.194		4.369	43.046	0.005	0.006	40.571	2.416	0.040	0.009
Gamma scan rod for MFFF (contains all three Pu loadings)	1987.564	1693.847	4.285	58.490	0.004	0.007	55.149	3.263	0.049	0.016
High Pu rod for MFFF	2000.895	1677.016	4.276	87.691	0.034	0.010	82.458	5.090	0.079	0.021
High Pu archive rod for removal of pellets	2002.847	1667.971	4.262	87.987	0.011	0.011	82.572	5.281	0.087	0.023
Medium Pu archive rod for removal of pellets	2003.924	1708.391	4.305	58.666	0.006	0.007	55.289	3.289	0.060	0.015
Medium Pu rod for MFFF	2003.076	1707.668	4.303	58.641	0.006	0.007	55.266	3.288	0.059	0.015
Medium Pu rod for IAEA	2001.600	1706.410	4.300	58.599	0.006	0.007	55.226	3.286	0.059	0.015
Low Pu rod for removal of pellets	2008.023	1727.687	4.371	42.815	0.005	0.006	40.353	2.403	0.039	0.009
Total	495.935									

The US fuel rod number is stamped on each rod, adjacent to the bar code about 12.25 inches above the bottom end of the fuel rod, and becomes visible when the rod box is opened. It may be necessary to rotate the rods slightly to view the rod number (Reference 4).

In Alternative 2 the rods will be shipped using a licensed (Type B) NAC-LWT shipping container. The lead shielded NAC-LWT will be leased from NAC in Atlanta, Georgia. The NAC-LWT with a rod canister is licensed for up to 16 MOX fuel rods. Reference 5 provides the NAC-LWT specifications. The NAC-LWT is typically used for transport of irradiated fuel and recently tritium (TPBARs) but it is licensed for use with unirradiated MOX material {Reference 5, Paragraphs 5.(b)(1)(xvii) and 5.(b)(2)(xviii)}.

If Alternative 2 is selected a detailed procedure would be developed, perhaps under a LANL contract with AREVA, to extract the specified rods from the FS-65 at LANL. The eight rods are in the top bundle of rods with one rod from the top row and the rest in the second row from the top. Generally the process, performed in room the repack room of PF-4 at LANL, consists of the following steps:

- Define and schedule availability of the transportation vehicle used to transfer the NAC-LWT containing eight rods to ORNL. The NAC-LWT is a licensed Type B(U)F-96 shipping container so it is likely that a commercial carrier can be used. On the day(s) of work the vehicle will be parked outside the north door of PF-4.

- Acquire a rod box table (Figure 5). These may be in the cargo containers at LANL. If not it will be necessary to either arrange shipment of them from AREVA or else set up an alternative winch and table or rolling strongback.
- Acquire one NAC-LWT shipping container, uncontaminated rod canister, and spacers (if needed) from NAC in Atlanta, Georgia
- Acquire 8 stainless steel dummy rods of the approximate weight and dimensions as the 8 sample rods.
- Transfer the table and rod canister into PF-4 repack room
- Transfer the rod box FS-65 into the new PF-4 repack room (walk down to check fit)
- Open the FS-65 and pull the steel rod box onto the table
- Radiological control technicians take radiological dose and contamination smear samples and authorize work
- Unbolt the top of the rod box; there are five dummy rods on top
- Two personnel select the eight sample rods. Carefully, precluding damage, lift the top rods, place them on a separate table, and sort through the rods to find the specified eight. The rods are flexible and may sustain damage by bending. According to AREVA (George Meyer) damage to the rods will be avoided if each rod is symmetrically picked up and moved by two persons, each of whom handles the rods with their hands spread wide.
- Lift the eight specified rods onto the rod box table
- Place the remaining rods back into the rod box, noting locations. Replace the eight rods that were removed with eight stainless steel dummy rods to keep the array tight.
- Slide the rod box back into the FS-65
- Close the FS-65
- Move the FS-65 back into storage
- Place the eight sample rods into the new rod canister and place the lid on the rod canister
- Remove the rod box table from the repack room
- Move the truck containing the NAC-LWT shipping container as close to the exterior door to the repack room as feasible. Put the canister on a rolling strongback and take it out the north door for direct loading into the LWT. Verify whether the loading can be performed horizontally.
- Slide the rod canister containing the eight MOX fuel rods into the NAC-LWT package. (NAC will need to be consulted whether the NAC-LWT can be loaded horizontally.
- Anchor the NAC-LWT onto the transportation vehicle and ship

3.2 Disposition of the 4 Excess FS-65s and Associated Sub-components

The implementation plan will include disposition of the excess FS-65 equipment which includes 4 empty FS-65 shipping containers and the associated cold support equipment presently located in cargo containers at LANL. It will be determined whether the FS-65 handling equipment will be needed by MOX Services to remove the contents for use in fuel fabrication. In that case, disposition of the sub-components would consist of shipping them to SRS. If the equipment is not needed by MOX Services then the first inquiry is whether AREVA is interested in acquisition of the equipment and materials. As a last alternative, a solicitation of interest could be extended to commercial metal-recovery companies to reclaim the materials. For purposes of this decision paper the disposition of this cold equipment and supplies is assumed revenue neutral (i.e. Attachment 1 does not include cost or revenue). Only

packaging and transportation costs are included in Attachment 1 and those costs are supported by the following facts and assumptions:

- The excess equipment will be dispositioned within the United States and transported by flatbed truck
- The insides of the FS-65s are clean. The costs do not include required deconning before they can be scrapped if they are not clean.
- The excess equipment is stored in nine cargo containers.
- Four of the cargo containers are 40 feet long and fit 1 per truck. Five are 20 feet long and fit 2 per truck.
- The four FS-65s are stored two per container in two of the 40 foot containers
- The other seven cargo containers hold miscellaneous ancillary hardware
- The entire inventory will fit in a total of seven truckloads as follows:
 - Due to weight restrictions the cargo containers that hold FS-65s are restricted to one cargo container per flatbed truck so two truckloads are required for FS-65s
 - The remaining two 40 foot containers (two truckloads) and five 20 foot containers (three truckloads) will take a total of five truckloads
- Seven flatbed trucks are available and it will take one business day to load all equipment
- Contractor (KSL) rigging support cost for one day is \$20k
- Flatbed truck rental cost is \$5k per truck for a total of \$35k

ATTACHMENT 1—ROUGH ORDER OF MAGNITUDE COST AND SCHEDULE

ATTACHMENT 2—DESCRIPTION OF EUROFAB EXCESS MATERIAL ROD BOX AND FUEL BUNDLE

ATTACHMENT 3—FIGURES AND REFERENCES

I. Figures

- Figure 1, FS-65 MOX Lead Assembly Shipping Package- Schematic
- Figure 2, FS-65 MOX Lead Assembly
- Figure 3, MOX Rod Box- Schematic
- Figure 4, MOX Rod Box- Close-Up
- Figure 5, Insertion of the MOX Rod Box into the FS-65 Shipping Container
- Figure 6, Insertion of the MOX Rod Box into the FS-65 Shipping Container- Close-Up
- Figure 7, MOX Fuel Assembly
- Figure 8, MOX Fuel Assembly Loaded into FS-65 Shipping Container
- Figure 9, NAC-LWT Cask Loaded into Shipping Container on Flatbed Trailer
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- Figure 12, NAC-LWT Cask is Raised to Vertical and Removed from ISO- Schematic
- Figure 13, NAC-LWT Cask at ORNL
- Figure 14, PWR Insert and Fuel Canister Loaded with NAC-LWT Cask
- Figure 15, NAC-LWT Basics- Schematic
- Figure 16, NAC-LWT General Description
- Figure 17, PWR Insert and PWR 5X5 Rod Canister- Schematic

II. References

- Reference 1, LANL memo from Jack Killeen to Ray Ferry, Subject: Submittal of Variance Request- MOX Fuel Storage at CMR (OSS-LANL-05-004), March 30, 2005
- Reference 2, FS-65 E Package Design Basis- Rod Box AA433, AREVA briefing chart, FS65E Tools and Equipment, Meeting DCS/LANL/ A. CL. July 12-14, 2004
- Reference 3, e-mail from Richard Clark to Jeanne Ball, Subject: MOX Rod Data, November 12, 2009
- Reference 4, e-mail from Richard Clark to Virginia Kay, Subject: More Information on MOX Rods at LANL, July 27, 2009
- Reference 5, Certificate of Compliance for Radioactive Material Packages, Certificate Number 9225, Package Identification Number USA/9225/B(U)F-96, NAC International, Inc, Revision 51 September 24, 2009
- Reference 6, e-mail from Richard Clark to Jeanne Ball, Subject: Eight Rods Desired from Rod Box, November 11, 2009
- Reference 6, Dose Rate from Side of a Single Fuel Rod (5% Pu in MOX) from MCNP (Data circa February, 2006)
- Reference 7, e-mail from Richard Clark to Jeanne Ball, Subject: FS-65s, November 11, 2009
- Reference 8, e-mail from Richard Clark to Jeanne Ball, Subject: NAC-LWT, December 1, 2009

ATTACHMENT 1- ROUGH ORDER OF MAGNITUDE COST AND SCHEDULE

Task	Description	Activity Duration (Days)	Person (FTE)	Person Type	Personnel Cost (\$k)	Travel, M&S (\$k)
1	Alternative 1.0 FS-65 with EMA to SRS. FS-65 with Rod Box to ORNL, Remove 8, Remaining Material to SRS	1258.5			5466	673
1.1	FS-65 Transportation Exemption Request	115			172.5	28
1.1.1	Finalize transportation configuration/compatibility and packaging details	20	1	NPI-1	30	5
1.1.2	Screen proposed packaging configuration vs FS-65 Design Basis	20	1	NPI-1	30	5
1.1.3	Identify gaps- proposed packaging vs FS-65 Design Basis	15	1	NPI-1	22.5	3
1.1.4	Define Mitigation- Analysis, O-ring change, Compensatory Measures	20	1	NPI-1	30	5
1.1.5	Prepare FS-65 Exemption Request	40	1	NPI-1	60	10
1.1.6	Approve FS-65 Exemption Request with Implementation Requirements	40	1	NNSA	N/A	N/A

1.2	Equipment Acquisition	280			420	430
1.2.1	Acquire Equipment required for FS-65 Transportation Exemption	60	1	NPI-1	90	100
1.2.2	Acquire FS-65 Packaging Equipment	60	1	NPI-1	90	100
1.2.3	Acquire Equipment Tie Downs for Transport Vehicle	20	1	NPI-1	30	20
1.2.4	Acquire Rod Box Table for use at ORNL, Basket, Unloading/Loading Equipment	120	1	.5 NPI-1 .5 Buyer	180	200
1.2.5	Relocate Required Hardware from on site (LANL) storage	20	1	NPI-1	30	10
1.3	FS-65 Packaging and Transportation Readiness	328			1197	0
1.3.1	Define Transport Vehicle- SST or Commercial	10	1	NPI-1	15	
1.3.2	Develop/ Approve Procedures- LANL, ORNL, SRS	60	3	NPI-1	270	
1.3.3	Establish Authorization Basis- Packaging Safety Evaluation Report	120	1.5	NPI-1	270	

1.3.4	Perform Safety Screen/ USQD	40	0.5	NPI-1	30	
1.3.5	Staff and Train Operations- LANL Operators at LANL, ORNL, SRS	60	5	NPI-1	450	
1.3.6	Perform Readiness Assessment	15	3	NPI-1	67.5	
1.3.7	Complete RA Corrective Actions	20	3	NPI-1	90	
1.3.8	Authorize Work- at LANL, ORNL, SRS	3	1	NPI-1	4.5	
1.4	Packaging and Transportation Pre-shipment Activities	205			1135.5	
1.4.1	Develop and Approve Transportation Plan- LANL, ORNL, SRS	112	2	NPI-1	336	
1.4.2	Schedule Shipment	10	3	NPI-1	45	
1.4.3	Arrange Transport Vehicle	20	1	NPI-1	30	50
1.4.4	Perform FS-65 Mitigation- Analysis, O-ring change, Compensatory Measures	60	8	2 RP-1 6 NPI-1	720	

1.4.5	Authorize Shipment	3	1	NPI-1	4.5	
1.5	Perform Shipment- FS-65's	232.5			2175	215
1.5.1	Mock Exercise- Simulate Load FS-65's on Transport Vehicle	30	5	NPI-1	225	75
1.5.2	Load Excess Material Assembly (EMA) FS-65 on Transport Vehicle	30	11	2 RP-1 6 NPI-1 3 Rigging	495	100
1.5.3	Ship (EMA) FS-65 to SRS	20	5	NPI-1	150	
1.5.4	Receive EMA FS-65 at SRS	20	5	NPI-1	150	
1.5.5	Ship FS-65 Ancillary Handling Equipment to SRS	20	5	NPI-1	150	
1.5.6	Ship Rod Box FS-65 to ORNL	20	5	NPI-1	150	
1.5.7	Ship Ancillary Rod Box Handling Equipment to ORNL	20	3	NPI-1	90	20
1.5.8	Unload Rod Box FS-65 at ORNL (LANL Performs)	2	8	2 RP-1 6 NPI-1	24	

1.5.9	Remove 8 rods at ORNL- Replace with Dummies (LANL Performs) Carefully, precluding damage, lift the top rods, place them on a separate table, and sort through the rods to find the specified eight. The rods are flexible and may sustain damage by bending	0.5	8	2 RP-1 6 NPI-1	6	
1.5.10	Load Rod Box with adjusted content onto FS-65 at ORNL (LANL Performs)	20	11	2 RP-1 6 NPI-1 3 Rigging	330	
1.5.11	Ship Ancillary Rod Box Handling Equipment from ORNL to SRS	20	3	NPI-1	90	20
1.5.12	Ship Adjusted Rod Box FS-65 and rolling cart to SRS	20	5	5 NPI-1	150	
1.5.13	Receive Adjusted Rod Box FS-65 and rolling cart at SRS	10	11	2 RP-1 6 NPI-1 3 Rigging	165	
1.5.14	Remove FS-65 (2) onto Rolling Carts at SRS (SRS Costs)				0	
1.6	Disposition of the Remaining 4 Excess FS-65s and Associated Sub-components from 11 LANL transportainers	98			366	
1.6.1	Identify Receiver (AREVA, Commercial, or Waste)	30	1	RP-1	45	
1.6.2	Rent and Receive Flat Bed Trucks	30	2	2 RP-1	90	50
1.6.3	Contract Rigging and Resources	30	3	2 RP-1	135	50

1.6.4	Load Trucks	5	11	2 RP-1 6 NPI-1 3 Rigging	82.5	
1.6.5	Transport to Receiver	3	3	3 RP-1	13.5	
2	Alternative 2.0 FS-65 with EMA to SRS. FS-65 with Rod Box- Remove 8 Rods at LANL, Remaining Material to SRS. 8 Rods transported to ORNL.	2073			7731	503
2.1	FS-65 Transportation Exemption Request	115			172.5	28
2.1.1	Finalize transportation configuration/compatibility and packaging details	20	1	NPI-1	30	5
2.1.2	Screen proposed packaging configuration vs FS-65 License	20	1	NPI-1	30	5
2.1.3	Identify gaps- proposed packaging vs FS-65 License	15	1	NPI-1	22.5	3
2.1.4	Define Mitigation- Analysis, O-ring change, Compensatory Measures	20	1	NPI-1	30	5
2.1.5	Prepare FS-65 Exemption Request	40	1	NPI-1	60	10
2.1.6	Approve FS-65 Exemption Request with Implementation Requirements	40	1	NNSA	N/A	N/A
2.2	NAC-LWT Transportation Request (for 8 rods)	100			150	25
2.2.1	Finalize transportation configuration/compatibility and packaging details for NAC-LWT	20	1	NPI-1	30	5
2.2.2	Screen proposed packaging configuration vs NAC-LWT License	20	1	NPI-1	30	5
2.2.3	Identify gaps- proposed packaging vs NAC-LWT License	20	1	NPI-1	30	5
2.2.4	Define Mitigation- Analysis, Compensatory Measures	20	1	NPI-1	30	5
2.2.5	Prepare NAC-LWT Exemption Request	20	1	NPI-1	30	5
2.2.6	Approve NAC-LWT Exemption Request with Implementation Requirements	10	1	NNSA		
2.3	Equipment Acquisition	400			600	450
2.3.1	Acquire Equipment required for FS-65 Transportation Exemption	60	1	NPI-1	90	100
2.3.2	Acquire FS-65 Packaging Equipment	60	1	NPI-1	90	100

2.3.3	Acquire Equipment Tie Downs for Transport Vehicle	20	1	NPI-1	30	20
2.3.4	Acquire Rod Box Table, Basket, Unloading/Loading Equipment	120	1	.5 NPI-1 .5 Buyer	180	200
2.3.5	Acquire one NAC-LWT shipping container, uncontaminated rod canister, and spacers (if needed) from NAC in Atlanta, Georgia	120	1	.5 NPI-1 .5 Buyer	180	20
2.3.6	Relocate FS-65 Ancillary Loading/Handling Equipment from LANL Storage	20	1	NPI-1	30	10
2.4	FS-65 Packaging and Transportation Readiness	328			1197	
2.4.1	Define FS-65 Transport Vehicle- SST or Commercial	10	1	NPI-1	15	
2.4.2	Develop/ Approve Procedures- LANL, ORNL, SRS	60	3	NPI-1	270	
2.4.3	Establish Authorization Basis- Packaging Safety Evaluation Report	120	1.5	NPI-1	270	
2.4.4	Perform Safety Screen/ USQD	40	0.5	NPI-1	30	
2.4.5	Staff and Train Operations- LANL Operators at LANL, ORNL, SRS	60	5	NPI-1	450	
2.4.6	Perform Readiness Assessment	15	3	NPI-1	67.5	
2.4.7	Complete RA Corrective Actions	20	3	NPI-1	90	
2.4.8	Authorize Work- at LANL, ORNL, SRS	3	1	NPI-1	4.5	
2.5	NAC-LWT Packaging and Transportation Readiness	355			1012.5	
2.5.1	Define NAC-LWT Transport Vehicle- SST or Commercial	40	1	NPI-1	60	
2.5.2	Develop/ Approve Procedures- LANL, ORNL, SRS	60	1.5	NPI-1	135	
2.5.3	Establish Authorization Basis- Packaging Safety Evaluation Report	120	0.5	NPI-1	90	
2.5.4	Perform Safety Screen/ USQD	40	5	NPI-1	300	
2.5.5	Staff and Train Operations- LANL Operators at LANL, ORNL, SRS	60	3	NPI-1	270	
2.5.6	Perform Readiness Assessment	15	3	NPI-1	67.5	
2.5.7	Complete RA Corrective Actions	20	3	NPI-1	90	
2.5.8	Authorize NAC-LWT pack at LANL- Unpack at ORNL	10	1	NNSA	15	
2.6	Packaging & Transportation Pre-Shipment Activities	436			1659	
2.6.1	Develop/ Approve Transportation Plan Include both FS-65's and NAC-LWT (LANL, ORNL, SRS)	150	2	NPI-1	450	

2.6.2	Schedule FS-65 Shipment	10	3	NPI-1	45	
2.6.3	Arrange FS-65 Transport Vehicle	20	1	NPI-1	30	50
2.6.4	Perform FS-65 Mitigation- Analysis, O-ring Change, Compensatory measures	60	8	2 RP-1 6 NPI-1	720	
2.6.5	Authorize FS-65 Shipment	3	1	NPI-1	4.5	
2.6.6	Schedule NAC-LWT Shipment	10	3	NPI-1	45	
2.6.7	Arrange NAC-LWT Transport Vehicle	30	1	NPI-1	45	
2.6.8	Perform NAC-LWT Mitigation- Compensatory Measures	30	3	NPI-1	135	50
2.6.9	Authorize NAC-LWT Shipment	3	1	NPI-1	4.5	
2.6.10	Develop Procedure- Loading of 8 Rods into NAC-LWT at LANL	120	1	NPI-1	180	
2.7	Perform Shipment- FS-65's & NAC-LWT	241			2574	
2.7.1	Mock Exercise- Simulate Load FS-65's on Transport Vehicle (Use "cold" FS-65)	30	5	NPI-1	225	75
2.7.2	Load Excess Material Assembly (EMA) FS-65 on Transport Vehicle	30	11	2 RP-1 6 NPI-1 3 Rigging	495	100
2.7.3	Ship (EMA) FS-65 to SRS	20	5	NPI-1	150	
2.7.4	Receive EMA FS-65 at SRS	20	5	NPI-1	150	
2.7.5	Transfer the rod box table, empty rod basket, and NAC-LWT into PF-4 repack room	30	4	NPI-1	180	200
2.7.6	Transfer the loaded rod box FS-65 into new PF-4 repack room (walk down to check fit)	1	8	2 RP-1 6 NPI-1	12	100
2.7.7	Open the FS-65 and pull the steel rod box onto the table	1	10	2 RP-1 6 NPI-1 2 Rigging	15	100
2.7.8	Radiological control technicians take radiological dose and contamination smear samples and authorize work	0.5	2	RP-1	1.5	
2.7.9	Unbolt the top of the rod box; there are five dummy rods on top	0.5	6	4 NPI-1 2 RP-1	4.5	
2.7.10	Select the eight sample rods. Carefully, precluding damage, lift the top rods, place them on a separate table, and sort through the rods to find the specified eight. The rods are flexible and may sustain damage by bending	0.5	8	2 RP-1 6 NPI-1	6	
2.7.11	Lift the eight specified rods onto the rod box table	0.5	8	2 RP-1 6 NPI-1	6	

2.7.12	Place the remaining rods back into the rod box, noting locations. Replace the eight rods that were removed with eight stainless steel dummy rods to keep the array tight	0.5	8	2 RP-1 6 NPI-1	6	
2.7.13	Slide the rod box back into the FS-65	0.5	10	2 RP-1 6 NPI-1 3 Rigging	7.5	50
2.7.14	Close the FS-65	0.5	8	2 RP-1 6 NPI-1	6	
2.7.15	Move the FS-65 back into storage	1	11	2 RP-1 6 NPI-1 3 Rigging	16.5	10
2.7.16	Place the eight sample rods into the new NAC rod canister and place the lid on the rod canister	2	8	2 RP-1 6 NPI-1	24	
2.7.17	Remove the rod box table from the repack room	0.5	8	2 RP-1 6 NPI-1	6	
2.7.18	Move the NAC-LWT shipping container into the south door (walk down to check fit)	1	11	2 RP-1 6 NPI-1 3 Rigging	16.5	10
2.7.19	Transport the rod canister containing the eight MOX fuel rods to the NAC-LWT package. (NAC will need to be consulted whether the NAC-LWT can be loaded horizontally)	0.5	11	2 RP-1 6 NPI-1 3 Rigging	8.25	10
2.7.20	Transfer the NAC-LWT onto the transportation vehicle and anchor	0.5	11	2 RP-1 6 NPI-1 3 Rigging	8.25	10
2.7.21	Ship NAC-LWT containing 8 rods from LANL to ORNL	20	3	3 NPI-1	90	
2.7.22	Receive NAC-LWT containing 8 rods at ORNL (ORNL Performs)	20	11	2 RP-1 6 NPI-1 3 Rigging	330	
2.7.23	Load Rod Box with adjusted content (with 8 dummy rods) onto FS-65 at LANL	20	11	2 RP-1 6 NPI-1 3 Rigging	330	
2.7.24	Ship Adjusted Rod Box FS-65 to SRS	20	5	5 NPI-1	150	

2.7.25	Receive 2 FS-65's at SRS (1 with Adjusted Rod Box) and unload to rolling carts.	20	11	2 RP-1 6 NPI-1 3 Rigging	330	
2.8	Disposition of the Remaining 4 Excess FS-65s and Associated Sub-components from 11 LANL transportainers	98			366	
2.8.1	Identify Receiver (AREVA, Commercial, or Waste)	30	1	RP-1	45	
2.8.2	Rent and Receive Flat Bed Trucks	30	2	2 RP-1	90	50
2.8.3	Contract Rigging and Resources	30	3	2 RP-1	135	50
2.8.4	Load Trucks	5	11	2 RP-1 6 NPI-1 3 Rigging	82.5	
2.8.5	Transport to Receiver	3	3	3 RP-1	13.5	

Notes:

1. Need to verify that the NAC-LWT and the FS-65 rod box will fit, individually, into the repack room in PF-4. Alternative is to load the NAC-LWT just outside- close to the north door. The AB case for this will be much easier for the 8 rods than for the larger amounts of material. Also need to verify staff availability (NPI-1) for the repacking.
2. Recommend if possible that this work be done at the dock. The cask is approximately 200 inches long, 44 inches in diameter, and will be heavy (part of the body is 5.75 inches lead). A first cut estimate for the weight of the package is 48,000 lbs.
3. Assumptions:
 - a. Scheduled durations= activity durations + 20%
 - b. Labor cost (fully loaded)= average \$325k per yr salary, = \$187/hr = \$1500/day= \$7.5k weekly
 - c. Working Day= 8 hrs
4. FS-65 Exemption Request costs are based on gaining transportation exemption for 1 time transport
5. Both Alternatives include same approach for disposition of excess equipment from transportainers (activities 1.6/ 2.8)

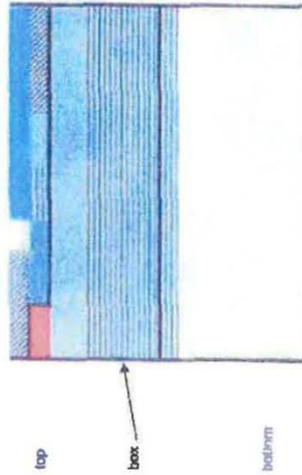
ATTACHMENT 2- DESCRIPTION OF EUROFAB MATERIAL ROD BOX AND FUEL
BUNDLE

DESCRIPTION OF EUROFAB EXCESS MATERIAL



BOX "LOS ALAMOS"

Total 175 170 + 5 inert rods



BT low enrichment
MT middle enrichment
HT high enrichment

Diagram 1

diagram	BT	MT	HT	total
diagram	1	3	4	8
non conforming standard rods	1	3	4	8
enriched rods added in the contract	1	3	4	8

Diagram 2

diagram	BT	MT	HT	total
diagram	1	16	17	34
calibration rods used by Csc	1	16	17	34
conforming standard rods	1	16	17	34

Diagram 3

diagram	BT	MT	HT	total
diagram	1	16	17	34
non conforming standard rods	1	16	17	34
enriched rods added in the contract	1	3	4	8
total	2	19	21	42

from Calc 401-56-000-0.03-0 date 21 MAR 05
Isotopes aged to June 1, 2005

Excess Material Rod Box

		Masse Oxyde Crayon	Masse U	Masse U235	Masse (Pu+Am)	Masse (Am)	Masse (Pu 238)	Masse (Pu 239)	Masse (Pu 240)	Masse (Pu241)	Masse (Pu242)
401.19.700.C03246	299317151158	2007.194	1726.729	4.369	43.046	0.005	0.006	40.571	2.416	0.040	0.009
401.19.700.C03246	299317153152	2007.972	1727.398	4.370	43.063	0.005	0.006	40.587	2.417	0.040	0.009
401.19.700.C03246	299317156153	2008.828	1728.134	4.372	43.081	0.005	0.006	40.604	2.418	0.040	0.009
401.19.700.C03246	299317159154	2008.023	1727.687	4.371	42.815	0.005	0.006	40.363	2.403	0.039	0.009
401.19.700.C03246	299317167159	2005.894	1725.610	4.366	43.018	0.005	0.006	40.545	2.414	0.040	0.009
401.19.700.C03246	299317194155	2008.674	1728.002	4.372	43.078	0.005	0.006	40.601	2.418	0.040	0.009
401.19.700.C03247	299317205158	2009.726	1728.907	4.374	43.101	0.005	0.006	40.622	2.419	0.040	0.009
401.19.700.C03248	299317258154	2009.100	1728.369	4.373	43.087	0.005	0.006	40.609	2.418	0.040	0.009
401.19.700.C03248	299317037155	2007.052	1726.635	4.368	43.013	0.005	0.006	40.540	2.414	0.040	0.009
401.19.700.C03248	299317097159	2008.393	1727.761	4.371	43.072	0.005	0.006	40.595	2.417	0.040	0.009
401.19.700.C03248	299317155156	2009.847	1729.011	4.374	43.103	0.005	0.006	40.624	2.419	0.040	0.009
401.19.700.C03249	299317273157	2009.144	1728.406	4.373	43.088	0.005	0.006	40.611	2.418	0.040	0.009
401.19.700.C03255	299327114150	2003.924	1708.391	4.305	58.666	0.006	0.007	55.289	3.289	0.060	0.015
401.19.700.C03255	299327157157	2003.076	1707.668	4.303	58.641	0.006	0.007	55.266	3.288	0.059	0.015
401.19.700.C03256	299327192158	2001.600	1706.410	4.300	58.599	0.006	0.007	55.226	3.286	0.059	0.015
401.19.700.C03257	299325312152	2007.006	1710.234	4.327	59.397	0.007	0.007	55.930	3.380	0.059	0.015
401.19.700.C03258	299327005151	1997.600	1702.802	4.308	58.530	0.003	0.007	55.027	3.247	0.049	0.016
401.19.700.C03258	299327019158	1998.600	1703.655	4.310	58.379	0.003	0.007	55.055	3.249	0.049	0.016
401.19.700.C03258	299327022158	2002.100	1707.214	5.105	58.599	0.004	0.006	55.219	3.296	0.058	0.016
401.19.700.C03258	299327083159	1996.900	1702.206	4.307	58.329	0.003	0.007	55.008	3.246	0.049	0.016
401.19.700.C03258	299327118158	2004.480	1710.227	5.112	58.667	0.004	0.006	55.284	3.299	0.058	0.016
401.19.700.C03258	299327128157	1994.700	1700.330	4.302	58.265	0.003	0.007	54.948	3.242	0.049	0.016
401.19.700.C03258	299327133151	1998.000	1703.143	4.309	58.381	0.003	0.007	55.038	3.248	0.049	0.016
401.19.700.C03258	299327141158	2002.500	1709.718	5.111	58.645	0.004	0.006	55.263	3.298	0.058	0.016
401.19.700.C03258	299327142153	1996.900	1702.206	4.307	58.329	0.003	0.007	55.008	3.246	0.049	0.016
401.19.700.C03258	299327144157	2002.220	1706.700	4.318	58.505	0.006	0.008	55.167	3.250	0.060	0.015
401.19.700.C03258	299327146151	2004.920	1708.023	5.105	58.588	0.004	0.006	55.209	3.295	0.058	0.016
401.19.700.C03258	299327166150	2013.100	1713.073	5.121	58.781	0.004	0.006	55.373	3.305	0.058	0.016
401.19.700.C03258	299327163158	1996.100	1701.524	4.305	58.306	0.003	0.007	54.986	3.245	0.049	0.016
401.19.700.C03258	299327173157	2002.281	1706.733	4.390	58.451	0.006	0.008	55.101	3.259	0.061	0.015
401.19.700.C03259	299327048158	1994.500	1700.481	4.302	57.695	0.017	0.017	54.166	3.387	0.095	0.013
401.19.700.C03262	299305070157	2002.847	1677.971	4.262	87.984	0.011	0.011	82.572	5.281	0.087	0.023
401.19.700.C03262	299305192156	2000.895	1677.016	4.276	87.691	0.034	0.010	82.458	5.090	0.079	0.021
401.19.700.C03263	299305547154	2009.100	1684.642	4.262	87.450	0.010	0.010	82.333	5.000	0.078	0.019
401.19.700.C03263	299305196154	2005.320	1680.725	4.286	87.885	0.034	0.010	82.640	5.101	0.079	0.021
401.19.700.C03263	299305206150	2007.687	1682.328	4.290	88.373	0.034	0.010	83.099	5.129	0.080	0.021
401.19.700.C03263	299305335157	2008.172	1682.669	4.257	88.427	0.008	0.011	83.135	5.161	0.087	0.024
401.19.700.C03263	299305141154	2012.700	1686.559	4.267	88.528	0.008	0.011	83.230	5.167	0.087	0.024
401.19.700.C03263	299305220156	2008.989	1681.773	4.255	88.276	0.008	0.011	82.994	5.153	0.087	0.024
401.19.700.C03263	299305019156	2002.693	1678.048	4.229	87.592	0.011	0.011	82.263	5.186	0.095	0.026
401.19.700.C03263	299305506151	2000.000	1676.555	4.242	86.999	0.009	0.010	81.753	5.133	0.074	0.022
401.19.700.C03263	299305550154	1999.898	1676.688	4.242	86.775	0.009	0.010	81.542	5.120	0.074	0.022
401.19.700.C03263	299295398156	2001.899	1678.072	4.246	87.158	0.009	0.010	81.901	5.142	0.074	0.022
401.19.700.C03263	299295013158	2003.134	1678.871	4.248	87.475	0.009	0.010	82.135	5.207	0.090	0.023
401.19.700.C03263	299295144159	2003.214	1679.452	4.249	86.967	0.009	0.010	81.658	5.177	0.090	0.023
401.19.700.C03263	299295375157	2003.608	1679.026	4.285	87.574	0.010	0.011	82.335	5.101	0.093	0.025
401.19.700.C03264	299295020156	2001.900	1677.598	4.260	87.501	0.010	0.011	82.258	5.105	0.093	0.024
401.19.700.C03264	299295254155	2000.624	1676.601	4.242	87.481	0.013	0.011	82.036	5.308	0.090	0.024
401.19.700.C03264	299295349158	2000.876	1676.813	4.242	87.493	0.013	0.011	82.047	5.309	0.090	0.024
401.19.700.C03264	299295001155	1995.085	1671.067	4.228	88.128	0.013	0.011	82.643	5.347	0.090	0.024
401.19.700.C03264	299295033156	1993.422	1670.382	4.226	87.358	0.013	0.011	81.920	5.301	0.090	0.024
401.19.700.C03264	299295078157	1994.543	1670.627	4.227	88.107	0.013	0.011	82.622	5.346	0.090	0.024
401.19.700.C03264	299295121150	1992.781	1669.151	4.223	88.029	0.013	0.011	82.549	5.342	0.090	0.024
401.19.700.C03264	299295130152	1996.817	1673.227	4.233	87.507	0.013	0.011	82.059	5.310	0.090	0.024
401.19.700.C03264	299295155155	1994.420	1670.527	4.227	88.100	0.013	0.011	82.816	5.345	0.090	0.024
401.19.700.C03264	299295160159	1996.478	1672.944	4.233	87.491	0.013	0.011	82.046	5.308	0.090	0.024
401.19.700.C03264	299295170158	1993.880	1670.075	4.225	88.076	0.013	0.011	82.594	5.344	0.090	0.024
401.19.700.C03264	299295175153	1994.419	1670.523	4.226	88.101	0.013	0.011	82.617	5.346	0.090	0.024
401.19.700.C03264	299295177157	1994.259	1670.392	4.226	88.093	0.013	0.011	82.609	5.345	0.090	0.024
401.19.700.C03264	299295195151	1994.557	1670.642	4.227	88.106	0.013	0.011	82.622	5.346	0.090	0.024

Excess Material Rod Box

		Masse Oxyde Chayon	Masse U	Masse U235	Masse (Pu+Am)	Masse (Am)	Masse (Pu 238)	Masse (Pu 239)	Masse (Pu 240)	Masse (Pu241)	Masse (Pu242)
401.19.700.C03264	299295321154	1994.843	1670.881	4.227	88.118	0.013	0.011	82.634	5.346	0.090	0.024
401.19.700.C03264	299295324155	1995.835	1671.712	4.230	88.162	0.013	0.011	82.675	5.349	0.090	0.024
401.19.700.C03264	299295332150	1994.424	1670.528	4.226	88.102	0.013	0.011	82.617	5.346	0.090	0.024
401.19.700.C03264	299295337155	1993.457	1669.718	4.224	88.059	0.013	0.011	82.577	5.343	0.090	0.024
401.19.700.C03264	299295086152	1995.127	1671.119	4.228	88.131	0.013	0.011	82.645	5.347	0.090	0.024
401.19.700.C03264	299295141158	1994.963	1671.674	4.229	87.425	0.013	0.011	81.983	5.304	0.090	0.024
401.19.700.C03264	299295158156	1997.198	1673.546	4.234	87.523	0.013	0.011	82.075	5.311	0.090	0.024
401.19.700.C03264	299295164157	1994.800	1671.537	4.229	87.418	0.013	0.011	81.976	5.305	0.090	0.024
401.19.700.C03264	299295172152	1996.595	1673.042	4.233	87.497	0.013	0.011	82.050	5.309	0.090	0.024
401.19.700.C03264	299295181154	1994.615	1671.382	4.229	87.410	0.013	0.011	81.969	5.304	0.090	0.024
401.19.700.C03264	299295188153	1994.905	1671.528	4.229	87.524	0.013	0.011	82.076	5.310	0.090	0.024
401.19.700.C03264	299295204150	1996.101	1672.628	4.232	87.475	0.013	0.011	82.030	5.307	0.090	0.024
401.19.700.C03264	299295214159	1996.277	1672.774	4.232	87.483	0.013	0.011	82.037	5.308	0.090	0.024
401.19.700.C03264	299295215156	1992.837	1669.892	4.225	87.332	0.013	0.011	81.896	5.299	0.089	0.024
401.19.700.C03264	299295283155	1997.285	1673.620	4.234	87.527	0.013	0.011	82.079	5.311	0.090	0.024
401.19.700.C03264	299295285159	1997.073	1673.442	4.234	87.518	0.013	0.011	82.070	5.310	0.090	0.024
401.19.700.C03264	299295296159	1995.973	1672.520	4.231	87.470	0.013	0.011	82.025	5.308	0.090	0.024
401.19.700.C03264	299295306151	1995.823	1672.394	4.231	87.463	0.013	0.011	82.018	5.307	0.090	0.024
401.19.700.C03264	299295318154	1998.183	1674.372	4.236	87.566	0.013	0.011	82.116	5.313	0.090	0.024
401.19.700.C03264	299295322151	1994.200	1671.034	4.228	87.392	0.013	0.011	81.952	5.303	0.090	0.024
401.19.700.C03264	299295208158	1993.943	1670.127	4.225	88.079	0.013	0.011	82.596	5.344	0.090	0.024
401.19.700.C03264	299295288150	1992.757	1669.131	4.223	88.028	0.013	0.011	82.548	5.342	0.090	0.024
401.19.700.C03264	299295315153	1991.873	1668.391	4.221	87.989	0.013	0.011	82.512	5.339	0.090	0.024
401.19.700.C03265	299305231152	2008.346	1683.560	4.209	87.287	0.008	0.010	82.067	5.102	0.079	0.021
401.19.700.C03265	299305280150	2006.422	1681.268	4.287	88.318	0.034	0.010	83.047	5.126	0.079	0.021
401.19.700.C03265	299305292153	2005.593	1681.038	4.287	87.811	0.034	0.010	82.570	5.097	0.079	0.021
401.19.700.C03265	299305320153	2007.247	1682.506	4.257	87.589	0.008	0.010	82.438	5.031	0.081	0.022
401.19.700.C03265	299305018159	2002.205	1677.213	4.260	88.177	0.011	0.011	82.752	5.293	0.087	0.023
401.19.700.C03265	299305079150	1996.504	1672.891	4.266	87.599	0.008	0.010	82.459	5.024	0.079	0.019
401.19.700.C03265	299305091152	2000.800	1676.035	4.257	88.115	0.011	0.011	82.694	5.290	0.087	0.023
401.19.700.C03265	299305101158	2001.093	1676.282	4.258	88.128	0.011	0.011	82.706	5.290	0.087	0.023
401.19.700.C03265	299305111157	2000.300	1675.748	4.256	87.961	0.011	0.011	82.550	5.280	0.087	0.023
401.19.700.C03265	299305476157	2001.407	1678.106	4.246	86.987	0.008	0.010	81.871	4.997	0.080	0.022
401.19.700.C03265	299305078153	2003.281	1678.768	4.264	87.244	0.008	0.010	81.909	5.210	0.084	0.023
401.19.700.C03265	299305130158	1999.826	1675.872	4.257	87.092	0.008	0.010	81.767	5.201	0.083	0.023
401.19.700.C03265	299305354158	2004.009	1679.374	4.249	87.746	0.009	0.011	82.389	5.223	0.091	0.023
401.19.700.C03265	299305454155	2004.700	1679.169	4.265	88.092	0.008	0.011	82.705	5.261	0.084	0.023
401.19.700.C03265	299295151157	1999.925	1676.015	4.240	87.451	0.013	0.011	82.007	5.307	0.090	0.024
401.19.700.C03265	299295409159	2000.823	1676.796	4.242	87.434	0.009	0.010	82.083	5.232	0.080	0.022
401.19.700.C03266	299305358156	2005.117	1681.485	4.254	87.092	0.010	0.010	81.996	4.980	0.078	0.019
401.19.700.C03266	299305394154	2006.800	1682.896	4.258	87.165	0.010	0.010	82.065	4.984	0.078	0.019
401.19.700.C03266	299305413162	2004.796	1681.216	4.253	87.078	0.010	0.010	81.983	4.979	0.078	0.019
401.19.700.C03266	299305416153	2004.229	1680.740	4.252	87.054	0.010	0.010	81.960	4.978	0.078	0.019
401.19.700.C03266	299305498159	2005.300	1681.594	4.254	87.145	0.010	0.010	82.046	4.983	0.078	0.019
401.19.700.C03266	299305569156	2004.104	1680.636	4.252	87.048	0.010	0.010	81.955	4.977	0.078	0.019
401.19.700.C03266	299305414159	2008.110	1683.993	4.261	87.224	0.010	0.010	82.120	4.988	0.078	0.019
401.19.700.C03266	299305483155	2004.990	1681.379	4.254	87.087	0.010	0.010	81.991	4.980	0.078	0.019
401.19.700.C03266	299305418157	2003.100	1678.983	4.267	87.579	0.023	0.010	82.384	5.061	0.080	0.021
401.19.700.C03266	299305195157	2005.974	1681.439	4.254	87.533	0.008	0.010	82.385	5.028	0.080	0.022
401.19.700.C03268	299295140151	1997.526	1673.821	4.236	87.538	0.013	0.011	82.088	5.312	0.090	0.024
401.19.700.C03269	299305478151	2004.797	1679.384	4.266	88.291	0.011	0.011	82.860	5.300	0.087	0.023
402.19.700.C03273	299295158152	1984.317	1653.926	4.184	86.316	0.008	0.009	81.110	5.093	0.074	0.022
402.19.700.C03273	299295161156	1983.602	1662.084	4.238	87.027	0.008	0.010	81.921	4.991	0.078	0.019
402.19.700.C03273	299295162153	1986.798	1664.762	4.245	87.167	0.008	0.010	82.053	4.999	0.078	0.019
402.19.700.C03273	299295176150	1997.496	1674.480	4.236	87.075	0.008	0.010	81.957	5.000	0.080	0.022
402.19.700.C03273	299295190156	1999.204	1675.861	4.240	87.171	0.008	0.010	82.045	5.007	0.080	0.022
402.19.700.C03273	299295199159	1982.137	1660.858	4.235	86.962	0.008	0.010	81.860	4.987	0.078	0.019
402.19.700.C03273	299295231156	1996.146	1672.736	4.225	87.693	0.008	0.010	82.448	5.120	0.086	0.023
402.19.700.C03273	299295234157	1979.200	1658.395	4.229	86.833	0.008	0.010	81.739	4.980	0.078	0.019
402.19.700.C03273	299295241155	1985.683	1663.811	4.243	87.117	0.008	0.010	82.006	4.998	0.078	0.019

Excess Material Rod Box

		Masse Oxyde Crayon	Masse U	Masse U235	Masse (Pu+Am)	Masse (Am)	Masse (Pu 238)	Masse (Pu 239)	Masse (Pu 240)	Masse (Pu241)	Masse (Pu242)
402.19.700.C03273	299295243159	1998.000	1675.224	4.244	87.000	0.009	0.010	81.907	4.977	0.077	0.019
402.19.700.C03273	299295250157	1994.754	1671.478	4.229	87.779	0.008	0.011	82.526	5.124	0.087	0.024
402.19.700.C03273	299295262150	2003.725	1679.851	4.250	87.368	0.008	0.010	82.230	5.018	0.080	0.022
402.19.700.C03273	299295275150	1987.300	1662.848	4.195	86.808	0.010	0.010	81.538	5.135	0.089	0.025
402.19.700.C03273	299295279158	1996.256	1673.376	4.183	86.811	0.008	0.010	81.620	5.074	0.079	0.021
402.19.700.C03273	299295290153	2005.175	1680.866	4.253	87.432	0.008	0.010	82.290	5.022	0.080	0.022
402.19.700.C03273	299295304157	1987.122	1656.264	4.190	86.438	0.008	0.010	81.225	5.100	0.074	0.022
402.19.700.C03273	299295339159	1999.444	1676.051	4.202	87.006	0.008	0.010	81.825	5.084	0.079	0.021
402.19.700.C03273	299295065157	1985.283	1654.731	4.186	86.358	0.008	0.009	81.150	5.095	0.074	0.022
402.19.700.C03273	299295095154	1994.591	1671.461	4.229	87.273	0.009	0.010	81.931	5.222	0.079	0.022
402.19.700.C03273	299295098155	1995.088	1671.933	4.237	87.119	0.009	0.010	81.797	5.193	0.087	0.023
402.19.700.C03273	299295108151	1990.086	1668.028	4.220	86.814	0.009	0.010	81.514	5.168	0.090	0.023
402.19.700.C03273	299295112158	1999.209	1675.331	4.239	87.475	0.009	0.010	82.121	5.235	0.080	0.022
402.19.700.C03273	299295132156	1992.514	1670.063	4.225	86.919	0.009	0.010	81.613	5.174	0.090	0.023
402.19.700.C03273	299295134150	1992.753	1670.053	4.225	87.092	0.009	0.010	81.766	5.201	0.083	0.022
402.19.700.C03273	299295145156	2004.917	1680.650	4.252	87.420	0.008	0.010	82.279	5.021	0.080	0.022
402.19.700.C03273	299295149154	1996.300	1672.568	4.248	87.288	0.008	0.010	81.951	5.213	0.084	0.023
402.19.700.C03273	299295194154	1989.112	1666.637	4.205	87.010	0.011	0.010	81.711	5.158	0.093	0.026
402.19.700.C03273	299295230159	1972.984	1651.333	4.178	86.604	0.008	0.010	81.412	5.067	0.083	0.023
402.19.700.C03273	299295246150	2001.083	1677.436	4.244	87.253	0.008	0.010	82.121	5.012	0.080	0.022
402.19.700.C03273	299295255152	1973.716	1645.090	4.162	85.855	0.008	0.009	80.676	5.065	0.073	0.021
402.19.700.C03273	299295259150	1997.412	1674.169	4.236	87.133	0.009	0.010	81.813	5.187	0.090	0.023
402.19.700.C03273	299295296155	1994.147	1671.089	4.228	87.254	0.009	0.010	81.912	5.221	0.079	0.022
402.19.700.C03273	299295311155	1992.503	1669.387	4.240	87.122	0.008	0.010	81.794	5.203	0.083	0.023
402.19.700.C03273	299295312152	1991.297	1668.376	4.238	87.069	0.008	0.010	81.744	5.200	0.083	0.023
402.19.700.C03273	299295397159	1989.488	1666.861	4.234	86.990	0.008	0.010	81.670	5.195	0.083	0.023
402.19.700.C03273	299295178154	1984.653	1663.012	4.219	87.121	0.020	0.011	81.771	5.210	0.086	0.023
402.19.700.C03273	299295182151	1985.790	1663.598	4.226	87.321	0.011	0.010	81.948	5.242	0.086	0.023
402.19.700.C03273	299295210151	1989.099	1666.368	4.233	87.467	0.011	0.010	82.085	5.251	0.086	0.023
402.19.700.C03273	299295217150	1988.318	1666.264	4.232	86.754	0.010	0.010	81.563	5.053	0.092	0.024
402.19.700.C03273	299295227159	1994.000	1670.697	4.227	87.553	0.013	0.011	82.101	5.313	0.090	0.024
402.19.700.C03273	299295245153	1990.708	1667.939	4.220	87.408	0.013	0.011	81.966	5.304	0.090	0.024
402.19.700.C03273	299295258153	1988.592	1666.166	4.215	87.315	0.013	0.011	81.879	5.298	0.089	0.024
402.19.700.C03273	299295265151	1986.381	1664.091	4.227	87.347	0.011	0.010	81.973	5.243	0.086	0.023
402.19.700.C03273	299295277154	1992.500	1669.217	4.240	87.616	0.011	0.011	82.225	5.260	0.086	0.023
402.19.700.C03273	299295278151	1987.100	1665.005	4.237	87.288	0.022	0.010	81.992	5.159	0.082	0.022
402.19.700.C03273	299295286156	1986.447	1664.368	4.211	87.221	0.013	0.011	81.790	5.293	0.089	0.024
402.19.700.C03273	299295292157	1985.419	1663.643	4.213	86.988	0.009	0.010	81.655	5.210	0.081	0.022
402.19.700.C03273	299295308155	1986.710	1664.366	4.227	87.362	0.011	0.010	81.966	5.244	0.086	0.023
402.19.700.C03273	299295313159	1986.901	1664.526	4.228	87.370	0.011	0.010	81.994	5.245	0.086	0.023
402.19.700.C03273	299295326159	1995.800	1672.534	4.248	87.081	0.010	0.010	81.870	5.072	0.093	0.024
402.19.700.C03273	299295334154	1990.382	1667.905	4.232	86.993	0.011	0.011	81.730	5.125	0.092	0.024
402.19.700.C03273	299295343156	1989.827	1667.529	4.236	86.820	0.010	0.010	81.625	5.057	0.092	0.024
402.19.700.C03274	299295244156	1988.000	1675.193	4.262	77.551	0.009	0.009	72.965	4.465	0.081	0.021
402.19.700.C03276	299295309152	1984.178	1653.810	4.184	86.310	0.008	0.009	81.103	5.092	0.074	0.022
402.19.700.C03276	299295338152	1991.774	1669.160	4.240	86.905	0.010	0.010	81.705	5.062	0.092	0.024
402.19.700.C03254.ETA LON	299305046132	1995.027	1672.243	4.230	86.925	0.008	0.009	81.681	5.126	0.074	0.022
402.19.700.C03253.ETA LON	299305085151	2001.550	1719.516	4.350	45.119	0.004	0.006	42.507	2.539	0.050	0.011
402.19.700.C03252.ETA LON	299325328153	1987.564	1693.847	4.285	58.490	0.004	0.007	55.149	3.263	0.049	0.016
402.19.700.C03267	299305024150	2007.884	1682.946	4.208	87.497	0.008	0.010	82.263	5.114	0.080	0.021

Excess Material Fuel Bundle

	Masse Oxyde Crayon	Masse U	Masse U235	Masse (Pu+Am)	Masse (Am)	Masse (Pu 238)	Masse (Pu 239)	Masse (Pu 240)	Masse (Pu 241)	Masse (Pu 242)
299305325158	2005.71	1681.219	4.253	87.521	0.008	0.010	82.374	5.027	0.080	0.022
299305446150	2000.25	1678.223	4.241	87.581	0.009	0.011	82.234	5.214	0.091	0.023
299295506155	1998.84	1675.508	4.239	87.023	0.009	0.010	81.775	5.134	0.074	0.022
299295524159	2001.91	1677.462	4.244	87.725	0.009	0.010	82.356	5.249	0.080	0.022
299295076153	2002.65	1678.324	4.246	87.514	0.009	0.010	82.158	5.236	0.080	0.022
299295171155	1998.30	1674.777	4.254	87.146	0.010	0.010	81.932	5.076	0.093	0.024
299295340155	2002.74	1678.194	4.263	87.640	0.010	0.011	82.396	5.105	0.093	0.025
299295007157	1992.30	1668.748	4.222	88.008	0.013	0.011	82.529	5.340	0.090	0.024
299295119157	1994.84	1670.877	4.227	88.120	0.013	0.011	82.635	5.347	0.090	0.024
299295179151	1992.28	1668.728	4.222	88.007	0.013	0.011	82.528	5.340	0.090	0.024
299295317157	1997.63	1673.907	4.235	87.542	0.013	0.011	82.093	5.312	0.090	0.024
299317165155	2011.16	1730.137	4.377	43.131	0.005	0.006	40.651	2.420	0.040	0.009
299317184156	2006.70	1726.304	4.368	43.036	0.005	0.006	40.561	2.415	0.040	0.009
299317189151	2005.08	1724.908	4.364	43.001	0.005	0.006	40.528	2.413	0.040	0.009
299317231157	2006.12	1725.807	4.366	43.023	0.005	0.006	40.549	2.414	0.040	0.009
299317158157	2009.22	1728.719	4.374	42.841	0.005	0.006	40.377	2.404	0.039	0.009
299317292158	2007.00	1726.456	4.368	42.970	0.005	0.006	40.482	2.419	0.046	0.011
299317024155	2011.54	1730.710	4.379	42.890	0.005	0.006	40.424	2.407	0.039	0.009
299317098156	2002.57	1722.866	4.359	42.825	0.005	0.006	40.362	2.403	0.039	0.009
299317100156	1995.73	1716.987	4.344	42.679	0.005	0.006	40.225	2.395	0.039	0.009
299325255152	1981.00	1688.767	4.956	58.075	0.005	0.005	54.730	3.273	0.048	0.014
299327138156	1997.60	1702.832	4.976	58.605	0.005	0.006	55.221	3.308	0.051	0.014
299327170156	1995.40	1698.265	4.361	58.165	0.003	0.007	54.849	3.240	0.050	0.016
299327071156	2003.96	1708.418	4.305	58.668	0.006	0.007	55.291	3.290	0.060	0.015
299327074157	1671.41	1433.777	3.627	40.070	0.037	0.038	37.162	2.656	0.168	0.010
299327084156	1674.45	1436.384	3.634	40.143	0.037	0.038	37.229	2.661	0.168	0.010
299327154156	1675.47	1437.252	3.636	40.168	0.037	0.038	37.252	2.662	0.168	0.010
299327199157	1665.84	1428.992	3.615	39.937	0.037	0.038	37.038	2.647	0.168	0.010
299327211156	1664.97	1428.245	3.613	39.916	0.037	0.038	37.018	2.646	0.167	0.010
299327241153	1677.14	1438.685	3.640	40.208	0.037	0.038	37.289	2.665	0.169	0.010
299327307156	1672.65	1434.835	3.630	40.100	0.037	0.038	37.189	2.658	0.168	0.010
299327415158	1677.43	1438.940	3.641	40.215	0.037	0.038	37.296	2.665	0.169	0.010
299327421159	1672.99	1419.524	3.591	55.910	0.089	0.094	51.143	4.188	0.382	0.014
299327062154	1682.32	1443.135	3.651	40.332	0.037	0.038	37.404	2.673	0.169	0.010
299327090157	1671.44	1433.795	3.628	40.071	0.037	0.038	37.162	2.656	0.168	0.010
299327111159	1675.17	1436.998	3.636	40.160	0.037	0.038	37.245	2.662	0.168	0.010
299327116154	1677.61	1439.091	3.641	40.219	0.037	0.038	37.299	2.666	0.169	0.010
299327190154	1679.48	1440.695	3.645	40.264	0.037	0.038	37.341	2.669	0.169	0.010
299327210159	1674.28	1436.236	3.634	40.139	0.037	0.038	37.225	2.660	0.168	0.010
299327212153	1668.41	1431.204	3.621	39.999	0.037	0.038	37.095	2.651	0.168	0.010
299327217158	1655.77	1420.361	3.594	39.696	0.037	0.037	36.814	2.631	0.166	0.010
299327225153	1671.90	1434.195	3.629	40.082	0.037	0.038	37.173	2.657	0.168	0.010
299327242150	1671.66	1433.985	3.628	40.076	0.037	0.038	37.167	2.656	0.168	0.010
299327252159	1674.62	1436.528	3.634	40.147	0.037	0.038	37.233	2.661	0.168	0.010
299327290151	1668.09	1430.923	3.620	39.991	0.037	0.038	37.088	2.651	0.168	0.010
299327320155	1674.92	1436.785	3.635	40.155	0.037	0.038	37.240	2.661	0.168	0.010
299327325150	1676.99	1438.562	3.640	40.204	0.037	0.038	37.286	2.665	0.169	0.010
299327332158	1670.34	1432.860	3.625	40.045	0.037	0.038	37.138	2.654	0.168	0.010
299327339157	1670.30	1432.821	3.625	40.044	0.037	0.038	37.137	2.654	0.168	0.010
299327349156	1667.07	1430.047	3.618	39.968	0.037	0.038	37.065	2.649	0.168	0.010
299327354150	1677.08	1438.638	3.640	40.206	0.037	0.038	37.288	2.665	0.169	0.010
299327007155	1686.91	1429.890	3.618	57.839	0.098	0.109	52.790	4.399	0.428	0.015
299327030153	1674.17	1419.088	3.590	57.402	0.097	0.108	52.391	4.365	0.425	0.015
299327035158	1658.83	1422.979	3.600	39.769	0.037	0.037	36.882	2.636	0.167	0.010
299327044150	1684.39	1427.758	3.612	57.753	0.098	0.109	52.711	4.392	0.427	0.015
299327045157	1670.11	1415.649	3.582	57.263	0.097	0.108	52.264	4.355	0.424	0.015
299327050151	1672.17	1417.396	3.586	57.334	0.097	0.108	52.328	4.360	0.424	0.015
299327054159	1678.23	1422.537	3.599	57.542	0.098	0.109	52.518	4.376	0.426	0.015
299327056153	1671.89	1417.161	3.585	57.324	0.097	0.108	52.320	4.360	0.424	0.015
299327086150	1670.94	1416.350	3.583	57.291	0.097	0.108	52.290	4.357	0.424	0.015

Excess Material Fuel Bundle

	Masse Oxyde Crayon	Masse U	Masse U235	Masse (Pu+Am)	Masse (Am)	Masse (Pu 238)	Masse (Pu 239)	Masse (Pu 240)	Masse (Pu 241)	Masse (Pu 242)
299327361158	1680.17	1424.174	3.603	57.608	0.098	0.109	52.579	4.381	0.426	0.015
299327387158	1683.60	1427.085	3.611	57.726	0.098	0.109	52.686	4.390	0.427	0.015
299327398154	1672.03	1417.279	3.586	57.329	0.097	0.108	52.324	4.360	0.424	0.015
299327417152	1678.46	1422.732	3.600	57.549	0.098	0.109	52.525	4.377	0.426	0.015
299327420152	1678.24	1422.538	3.599	57.542	0.098	0.109	52.518	4.376	0.426	0.015
299327004154	1680.79	1424.705	3.605	57.629	0.098	0.109	52.598	4.383	0.427	0.015
299327006158	1676.90	1421.408	3.596	57.466	0.098	0.109	52.477	4.373	0.426	0.015
299327013156	1685.07	1428.328	3.614	57.776	0.098	0.109	52.732	4.394	0.428	0.015
299327015150	1685.81	1428.955	3.615	57.801	0.098	0.109	52.755	4.396	0.428	0.015
299327018151	1687.13	1430.081	3.618	57.847	0.098	0.109	52.797	4.399	0.428	0.015
299327020154	1679.20	1423.354	3.601	57.575	0.098	0.109	52.548	4.379	0.426	0.015
299327033154	1683.40	1426.915	3.610	57.719	0.098	0.109	52.680	4.390	0.427	0.015
299327052155	1679.16	1423.318	3.601	57.573	0.098	0.109	52.547	4.378	0.426	0.015
299327087157	1685.59	1428.775	3.615	57.794	0.098	0.109	52.749	4.395	0.428	0.015
299327129154	1687.09	1430.044	3.618	57.845	0.098	0.109	52.795	4.399	0.428	0.015
299327360151	1669.60	1429.965	3.618	42.312	0.045	0.047	39.129	2.879	0.202	0.011
299327374158	1658.80	1408.084	3.557	56.875	0.097	0.107	51.910	4.325	0.421	0.015
299327379153	1682.21	1425.905	3.608	57.678	0.098	0.109	52.643	4.388	0.427	0.015
299327412157	1677.44	1421.867	3.597	57.515	0.098	0.109	52.494	4.374	0.426	0.015
299327072153	1673.52	1430.325	3.619	45.429	0.078	0.085	41.501	3.511	0.264	0.011
299327240156	1679.06	1435.060	3.631	45.580	0.079	0.085	41.638	3.523	0.264	0.011
299327256157	1678.97	1434.979	3.630	45.577	0.079	0.085	41.636	3.523	0.264	0.011
299327268150	1667.78	1425.414	3.606	45.273	0.078	0.084	41.358	3.499	0.263	0.011
299327314154	1669.83	1427.166	3.611	45.329	0.078	0.084	41.409	3.503	0.263	0.011
299327316158	1679.33	1435.291	3.631	45.587	0.079	0.085	41.645	3.523	0.265	0.011
299327317155	1678.59	1434.661	3.630	45.567	0.079	0.085	41.626	3.522	0.264	0.011
299327318152	1673.18	1430.033	3.618	45.420	0.078	0.084	41.492	3.511	0.264	0.011
299327321152	1679.97	1435.836	3.633	45.604	0.079	0.085	41.661	3.525	0.265	0.011
299327324153	1674.01	1430.739	3.620	45.443	0.078	0.085	41.513	3.512	0.264	0.011
299327326157	1668.62	1426.134	3.608	45.296	0.078	0.084	41.379	3.501	0.263	0.011
299327331151	1675.89	1432.352	3.624	45.494	0.079	0.085	41.559	3.516	0.264	0.011
299327338150	1678.93	1434.951	3.630	45.576	0.079	0.085	41.635	3.523	0.264	0.011
299327351159	1678.24	1434.357	3.629	45.567	0.079	0.085	41.618	3.521	0.264	0.011
299327375155	1671.78	1428.839	3.615	45.382	0.078	0.084	41.458	3.508	0.263	0.011
299327401151	1677.01	1433.305	3.626	45.524	0.079	0.085	41.587	3.519	0.264	0.011
299327066152	1679.73	1435.633	3.632	45.598	0.079	0.085	41.655	3.524	0.265	0.011
299327104151	1666.97	1424.729	3.605	45.252	0.078	0.084	41.338	3.498	0.263	0.011
299327110152	1672.12	1426.355	3.609	48.226	0.050	0.043	44.645	3.287	0.188	0.013
299327198150	1679.50	1435.432	3.632	45.592	0.079	0.085	41.649	3.524	0.265	0.011
299327203151	1680.37	1436.179	3.634	45.615	0.079	0.085	41.671	3.526	0.265	0.011
299327213150	1682.53	1438.026	3.638	45.674	0.079	0.085	41.724	3.530	0.265	0.011
299327224156	1671.19	1425.559	3.607	48.199	0.050	0.043	44.620	3.285	0.188	0.013
299327227157	1672.23	1426.445	3.609	48.229	0.050	0.043	44.648	3.287	0.188	0.013
299327230157	1660.98	1416.848	3.585	47.904	0.049	0.043	44.348	3.265	0.187	0.012
299327246158	1666.73	1421.753	3.597	48.070	0.050	0.043	44.501	3.278	0.187	0.012
299327259158	1680.97	1436.690	3.635	45.632	0.079	0.085	41.685	3.527	0.265	0.011
299327261151	1666.21	1421.316	3.596	48.055	0.050	0.043	44.488	3.275	0.187	0.012
299327265159	1669.68	1424.275	3.603	48.155	0.050	0.043	44.580	3.282	0.188	0.013
299327288158	1676.30	1432.703	3.625	45.505	0.079	0.085	41.570	3.517	0.264	0.011
299327304155	1665.78	1420.946	3.595	48.043	0.050	0.043	44.476	3.275	0.187	0.012
299327337153	1667.42	1422.347	3.599	48.090	0.050	0.043	44.520	3.278	0.187	0.013
299327403155	1684.90	1434.185	3.628	51.687	0.088	0.087	47.193	3.959	0.346	0.013
299327017154	1667.90	1422.758	3.600	48.104	0.050	0.043	44.633	3.279	0.187	0.013
299327180155	1667.30	1422.244	3.598	48.087	0.050	0.043	44.517	3.278	0.187	0.013
299327185150	1670.31	1424.813	3.605	48.173	0.050	0.043	44.597	3.284	0.188	0.013
299327222152	1671.08	1425.464	3.606	48.195	0.050	0.043	44.617	3.285	0.188	0.013
299327229151	1667.40	1422.325	3.598	48.089	0.050	0.043	44.519	3.278	0.187	0.013
299327233158	1670.91	1425.322	3.606	48.191	0.050	0.043	44.613	3.285	0.188	0.013
299327248152	1667.79	1422.659	3.599	48.101	0.050	0.043	44.530	3.279	0.187	0.013
299327270153	1671.64	1425.942	3.608	48.212	0.050	0.043	44.632	3.286	0.188	0.013

Excess Material Fuel Bundle

	Masse Oxide Crayon	Masse U	Masse U235	Masse (Pu+Am)	Masse (Am)	Masse (Pu 238)	Masse (Pu 239)	Masse (Pu 240)	Masse (Pu 241)	Masse (Pu 242)
299327272157	1668.46	1423.236	3.601	48.120	0.050	0.043	44.548	3.280	0.188	0.013
299327285157	1668.30	1423.097	3.600	48.115	0.050	0.043	44.543	3.280	0.188	0.013
299327298157	1669.31	1423.960	3.603	48.145	0.050	0.043	44.570	3.282	0.188	0.013
299327300157	1671.15	1425.530	3.607	48.198	0.050	0.043	44.620	3.285	0.188	0.013
299327306159	1671.05	1425.439	3.606	48.195	0.050	0.043	44.617	3.285	0.188	0.013
299327330154	1671.29	1425.648	3.607	48.202	0.050	0.043	44.623	3.285	0.188	0.013
299327333155	1664.21	1420.478	3.594	47.082	0.090	0.066	43.139	3.495	0.280	0.012
299327334152	1668.90	1423.606	3.602	48.133	0.050	0.043	44.559	3.281	0.188	0.013
299327356154	1670.70	1425.147	3.606	48.185	0.050	0.043	44.608	3.284	0.188	0.013
299327372154	1667.49	1422.404	3.599	48.092	0.050	0.043	44.522	3.278	0.187	0.013
299327073150	1665.50	1421.583	3.597	47.119	0.090	0.066	43.173	3.498	0.281	0.012
299327125156	1665.29	1421.407	3.596	47.113	0.090	0.066	43.168	3.497	0.281	0.012
299327209153	1666.79	1422.684	3.599	47.155	0.090	0.066	43.206	3.500	0.281	0.012
299327220158	1665.28	1421.397	3.596	47.113	0.090	0.066	43.167	3.497	0.281	0.012
299327221155	1669.81	1425.261	3.606	47.241	0.090	0.066	43.285	3.507	0.281	0.012
299327223159	1672.50	1427.557	3.612	47.317	0.090	0.066	43.354	3.512	0.282	0.012
299327226150	1667.49	1423.285	3.601	47.175	0.090	0.066	43.225	3.502	0.281	0.012
299327228154	1665.07	1421.219	3.596	47.107	0.090	0.066	43.162	3.497	0.281	0.012
299327235152	1664.10	1419.513	3.591	47.994	0.050	0.043	44.431	3.271	0.187	0.012
299327236159	1666.24	1422.211	3.598	47.139	0.090	0.066	43.192	3.499	0.281	0.012
299327249159	1663.76	1420.101	3.593	47.070	0.090	0.066	43.128	3.494	0.280	0.012
299327271150	1659.73	1416.654	3.584	46.955	0.089	0.066	43.023	3.485	0.280	0.012
299327294159	1663.07	1419.506	3.591	47.050	0.090	0.066	43.110	3.493	0.280	0.012
299327301154	1667.59	1423.368	3.601	47.178	0.090	0.066	43.227	3.502	0.281	0.012
299327302151	1660.63	1417.427	3.586	46.981	0.089	0.066	43.047	3.487	0.280	0.012
299327313157	1666.92	1422.792	3.600	47.159	0.090	0.066	43.210	3.501	0.281	0.012
299327340153	1667.01	1422.870	3.600	47.161	0.090	0.066	43.212	3.501	0.281	0.012
299327078155	1666.48	1421.548	3.597	48.063	0.050	0.043	44.495	3.276	0.187	0.012
299327177155	1670.52	1426.191	3.608	46.949	0.062	0.052	43.222	3.380	0.221	0.012
299327251152	1665.80	1421.834	3.621	47.125	0.090	0.066	43.185	3.513	0.280	0.012
299327305152	1680.38	1436.188	3.634	45.616	0.079	0.065	41.671	3.526	0.265	0.011
299327428158	1679.42	1435.366	3.631	45.590	0.079	0.065	41.647	3.524	0.265	0.011
299327040152	1699.44	1436.741	3.635	62.089	0.107	0.115	56.625	4.767	0.460	0.016
299327089151	1665.11	1421.246	3.596	47.108	0.090	0.066	43.163	3.497	0.281	0.012
299325034153	2002.68	1705.888	4.376	58.275	0.006	0.007	54.947	3.240	0.060	0.015
299327037152	1692.10	1430.537	3.619	61.821	0.107	0.114	56.380	4.747	0.458	0.015
299327047151	1702.40	1439.244	3.641	62.197	0.107	0.115	56.723	4.775	0.460	0.016
299327260154	1703.86	1440.480	3.644	62.251	0.108	0.115	56.772	4.780	0.461	0.016
299327319159	1693.27	1431.522	3.622	61.863	0.107	0.114	56.419	4.750	0.458	0.015
299327347152	1704.16	1440.733	3.645	62.262	0.108	0.115	56.782	4.780	0.461	0.016
299327350152	1702.74	1439.532	3.642	62.210	0.107	0.115	56.735	4.776	0.460	0.016
299327353153	1702.60	1439.415	3.642	62.205	0.107	0.115	56.730	4.776	0.460	0.016
299327368153	1700.84	1437.925	3.638	62.140	0.107	0.115	56.671	4.771	0.460	0.016
299327387150	1699.80	1437.050	3.636	62.102	0.107	0.115	56.637	4.768	0.460	0.016
299327368157	1700.54	1437.671	3.637	62.129	0.107	0.115	56.661	4.770	0.460	0.016
299327384157	1702.80	1439.579	3.642	62.212	0.108	0.115	56.736	4.777	0.460	0.016
299327385154	1700.26	1437.436	3.637	62.119	0.107	0.115	56.652	4.769	0.460	0.016
299327391155	1693.74	1431.919	3.623	61.881	0.107	0.114	56.434	4.751	0.458	0.015
299327397157	1699.46	1436.760	3.635	62.090	0.107	0.115	56.625	4.767	0.460	0.016
299327399151	1703.34	1440.039	3.643	62.231	0.108	0.115	56.754	4.778	0.461	0.016
299327409157	1702.46	1439.296	3.641	62.199	0.107	0.115	56.725	4.776	0.460	0.016
299327001153	1700.87	1437.947	3.638	62.141	0.107	0.115	56.672	4.771	0.460	0.016
299327011152	1700.20	1437.388	3.637	62.117	0.107	0.115	56.650	4.769	0.460	0.016
299327024152	1703.64	1440.289	3.644	62.242	0.108	0.115	56.784	4.779	0.461	0.016
299327032157	1698.05	1433.876	3.628	61.965	0.107	0.115	56.512	4.758	0.459	0.015
299327273154	1699.36	1436.673	3.635	62.086	0.107	0.115	56.622	4.767	0.460	0.016
299327345158	1696.15	1433.981	3.628	61.969	0.107	0.115	56.515	4.758	0.459	0.015
299327389152	1700.04	1437.251	3.636	62.111	0.107	0.115	56.645	4.769	0.460	0.016
299327395153	1698.90	1436.282	3.634	62.069	0.107	0.115	56.606	4.766	0.459	0.016
299327416155	1697.50	1435.102	3.631	62.018	0.107	0.115	56.560	4.762	0.459	0.016

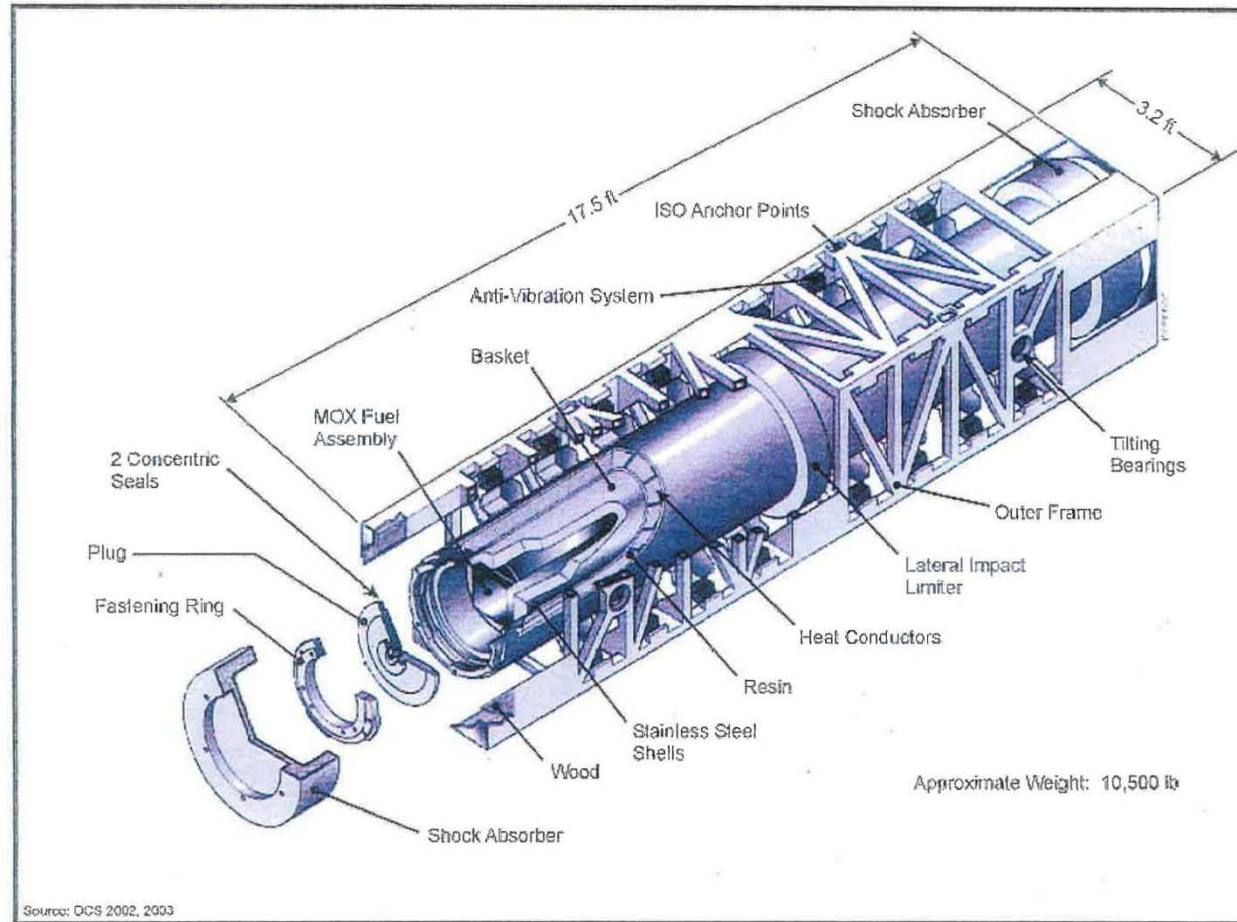
Excess Material Fuel Bundle

	Mass Oxide Crystalline	Mass (U)	Mass U235	Mass (Pu+Am)	Mass (Am)	Mass (Pu 238)	Mass (Pu 239)	Mass (Pu 240)	Mass (Pu 241)	Mass (Pu 242)
299327346155	1989.48	1695.963	4.291	58.113	0.003	0.007	54.804	3.234	0.049	0.016
299327028150	1985.82	1692.838	4.283	58.006	0.003	0.007	54.703	3.228	0.049	0.016
299327041159	1988.90	1695.299	4.289	58.034	0.003	0.007	54.730	3.230	0.049	0.016
299327280152	1969.81	1679.188	4.248	57.538	0.003	0.007	54.262	3.202	0.048	0.016
299327362155	1988.30	1694.791	4.288	58.017	0.003	0.007	54.713	3.229	0.049	0.016
299327371157	1987.11	1693.772	4.285	57.982	0.003	0.007	54.680	3.227	0.049	0.016
299327382153	1987.29	1693.927	4.286	57.987	0.003	0.007	54.685	3.227	0.049	0.016
299327408150	1992.50	1698.535	4.297	58.201	0.003	0.007	54.887	3.239	0.049	0.016
299327423153	1989.10	1695.466	4.290	58.040	0.003	0.007	54.735	3.230	0.049	0.016
299327002150	1992.06	1697.988	4.296	58.126	0.003	0.007	54.816	3.235	0.049	0.016
299327003157	1986.23	1693.019	4.283	57.956	0.003	0.007	54.656	3.225	0.049	0.016
299327092151	1990.74	1696.751	4.293	58.084	0.003	0.007	54.777	3.232	0.049	0.016
299327215154	1983.81	1690.956	4.278	57.885	0.003	0.007	54.589	3.221	0.049	0.016
299327288153	1984.74	1691.756	4.280	57.913	0.003	0.007	54.615	3.223	0.049	0.016
299327315151	1987.37	1693.880	4.286	57.986	0.003	0.007	54.684	3.227	0.049	0.016
299327358158	1992.66	1698.675	4.298	58.150	0.003	0.007	54.839	3.236	0.049	0.016
299327363152	1984.07	1691.177	4.279	57.893	0.003	0.007	54.597	3.222	0.049	0.016
299327369154	1982.83	1690.128	4.276	57.857	0.003	0.007	54.563	3.220	0.049	0.016
299327377159	1981.93	1690.065	4.276	57.330	0.017	0.017	53.824	3.385	0.094	0.013
299327378156	1987.78	1695.054	4.288	57.499	0.017	0.017	53.983	3.375	0.095	0.013
299327381156	1983.40	1690.606	4.277	57.873	0.003	0.007	54.578	3.221	0.049	0.016
299327388155	1983.13	1690.268	4.276	57.862	0.003	0.007	54.567	3.220	0.049	0.016
299327392152	1989.17	1695.419	4.289	58.038	0.003	0.007	54.733	3.230	0.049	0.016
299327394156	1987.08	1693.619	4.285	57.977	0.003	0.007	54.676	3.226	0.049	0.016
299327396150	1991.54	1697.552	4.295	58.111	0.003	0.007	54.802	3.234	0.049	0.016
299327406156	1994.54	1700.105	4.301	58.199	0.003	0.007	54.885	3.239	0.049	0.016
299327414151	1987.66	1694.238	4.286	57.998	0.003	0.007	54.695	3.228	0.049	0.016
299327103154	1988.32	1695.210	4.289	57.516	0.017	0.017	53.998	3.376	0.095	0.013
299327174154	1985.30	1692.768	4.283	57.428	0.017	0.017	53.915	3.371	0.095	0.013
299327175151	1984.05	1691.882	4.280	57.391	0.017	0.017	53.880	3.369	0.095	0.013
299327182159	1984.41	1692.184	4.281	57.401	0.017	0.017	53.890	3.369	0.095	0.013
299327189158	1981.41	1689.626	4.275	57.314	0.017	0.017	53.808	3.364	0.094	0.013
299327254153	1985.13	1692.798	4.283	57.422	0.017	0.017	53.909	3.371	0.095	0.013
299327258151	1979.54	1688.035	4.271	57.260	0.017	0.017	53.758	3.361	0.094	0.013
299327263155	1982.92	1690.917	4.278	57.358	0.017	0.017	53.849	3.367	0.094	0.013
299327286154	1984.67	1692.409	4.282	57.409	0.017	0.017	53.897	3.370	0.095	0.013
299327292155	1993.42	1699.557	4.300	57.664	0.017	0.017	54.138	3.385	0.095	0.013
299327293152	1979.76	1688.219	4.271	57.266	0.017	0.017	53.763	3.362	0.094	0.013
299327297150	1984.37	1692.148	4.281	57.400	0.017	0.017	53.889	3.369	0.095	0.013
299327311153	1979.69	1688.163	4.271	57.265	0.017	0.017	53.761	3.361	0.094	0.013
299327329158	1983.93	1691.779	4.280	57.387	0.017	0.017	53.876	3.369	0.095	0.013
299327357151	1980.69	1689.015	4.273	57.293	0.017	0.017	53.788	3.363	0.094	0.013
299327364159	1982.28	1690.368	4.277	57.339	0.017	0.017	53.831	3.366	0.094	0.013
299327400154	1991.48	1697.908	4.296	57.609	0.017	0.017	54.084	3.381	0.095	0.013
299327405159	1981.35	1689.572	4.275	57.312	0.017	0.017	53.808	3.364	0.094	0.013
299327021151	1988.20	1695.110	4.289	57.513	0.017	0.017	53.994	3.376	0.095	0.013
299327023155	1986.65	1693.785	4.285	57.469	0.017	0.017	53.953	3.373	0.095	0.013
299327085155	1979.32	1687.223	4.269	57.543	0.009	0.011	54.165	3.274	0.068	0.015
299327067159	1985.87	1692.715	4.283	57.946	0.003	0.007	54.645	3.225	0.049	0.016
299327284152	1984.53	1691.575	4.280	57.907	0.003	0.007	54.608	3.223	0.049	0.016
299327295156	1979.99	1688.413	4.272	57.273	0.017	0.017	53.769	3.362	0.094	0.013
299327352156	1990.58	1697.140	4.294	57.582	0.017	0.017	54.058	3.380	0.095	0.013
299327355157	1991.05	1697.541	4.295	57.596	0.017	0.017	54.073	3.380	0.095	0.013
299327413154	1992.50	1698.775	4.298	57.637	0.017	0.017	54.110	3.383	0.095	0.013
299327081155	2001.95	1706.709	4.301	58.609	0.006	0.007	55.053	3.464	0.062	0.016
299327247155	1996.15	1701.804	4.294	58.212	0.010	0.010	54.670	3.433	0.072	0.015
299327411150	2001.20	1706.069	4.299	58.587	0.006	0.007	55.032	3.463	0.062	0.016
299327418159	1995.10	1700.869	4.286	58.409	0.006	0.007	54.864	3.453	0.062	0.016
299327049155	1990.97	1696.862	4.293	58.856	0.007	0.007	55.230	3.338	0.058	0.015
299327094155	1990.74	1697.041	4.280	58.362	0.006	0.007	54.850	3.421	0.061	0.015

Excess Material Fuel Bundle

	Mass Oxide Crayon	Mass U	Mass U235	Mass (Pu+Am)	Mass (Am)	Mass (Pu 238)	Mass (Pu 239)	Mass (Pu 240)	Mass (Pu 241)	Mass (Pu 242)
299327204158	1992.98	1698.578	4.297	58.715	0.007	0.007	55.286	3.341	0.058	0.015
299327402158	1994.62	1699.978	4.301	58.764	0.007	0.007	55.332	3.344	0.058	0.015
299327287151	1994.61	1699.967	4.301	58.763	0.007	0.007	55.332	3.344	0.058	0.015
299327310156	1992.79	1698.418	4.297	58.710	0.007	0.007	55.281	3.341	0.058	0.015
299305261159	2005.68	1680.645	4.286	88.285	0.034	0.010	83.015	5.124	0.079	0.021
299305338158	2004.78	1681.016	4.253	87.262	0.010	0.010	82.155	4.990	0.078	0.019
299305469159	2002.67	1677.992	4.262	87.479	0.008	0.010	82.128	5.224	0.084	0.023
299305571159	2001.79	1677.252	4.260	87.440	0.008	0.010	82.092	5.222	0.084	0.023
299305599153	2003.73	1678.883	4.264	87.525	0.008	0.011	82.173	5.227	0.084	0.023
299305626156	2003.01	1678.281	4.263	87.494	0.008	0.010	82.142	5.225	0.084	0.023
299317017157	2002.60	1722.671	4.358	42.876	0.005	0.006	40.393	2.413	0.046	0.011
299317093151	2004.96	1724.810	4.364	42.998	0.005	0.006	40.525	2.413	0.040	0.009
299317105151	2009.81	1728.977	4.374	43.102	0.005	0.006	40.623	2.419	0.040	0.009
299317125159	2006.01	1725.707	4.366	43.021	0.005	0.006	40.546	2.414	0.040	0.009
299317128150	2006.31	1725.965	4.367	43.027	0.005	0.006	40.552	2.415	0.040	0.009
299317142156	2004.34	1724.270	4.362	42.985	0.005	0.006	40.512	2.412	0.040	0.009
299317208159	2006.08	1725.668	4.366	42.950	0.005	0.006	40.463	2.418	0.046	0.011
299325080150	2001.10	1705.861	4.316	58.290	0.008	0.008	54.963	3.238	0.080	0.015
299325252151	1995.96	1701.724	4.305	57.867	0.017	0.017	54.326	3.397	0.095	0.013
299325302153	2000.69	1705.174	4.314	58.742	0.006	0.008	55.389	3.263	0.060	0.015
299327008152	2007.43	1710.924	4.329	59.079	0.007	0.007	55.629	3.362	0.058	0.015
299327134158	2008.16	1711.543	4.330	59.101	0.007	0.007	55.650	3.363	0.058	0.015
299327164155	2007.32	1710.830	4.328	59.076	0.007	0.007	55.626	3.362	0.058	0.015
299327187154	2006.71	1710.177	4.327	59.190	0.007	0.007	55.734	3.368	0.058	0.015

FS-65 SHIPPING CONTAINER FIGURES



Fabrication of Lead Assemblies in Europe

Figure 1, FS-65 MOX Lead Assembly Shipping Package- Schematic



MOX ROD BOX AA433 FIGURES

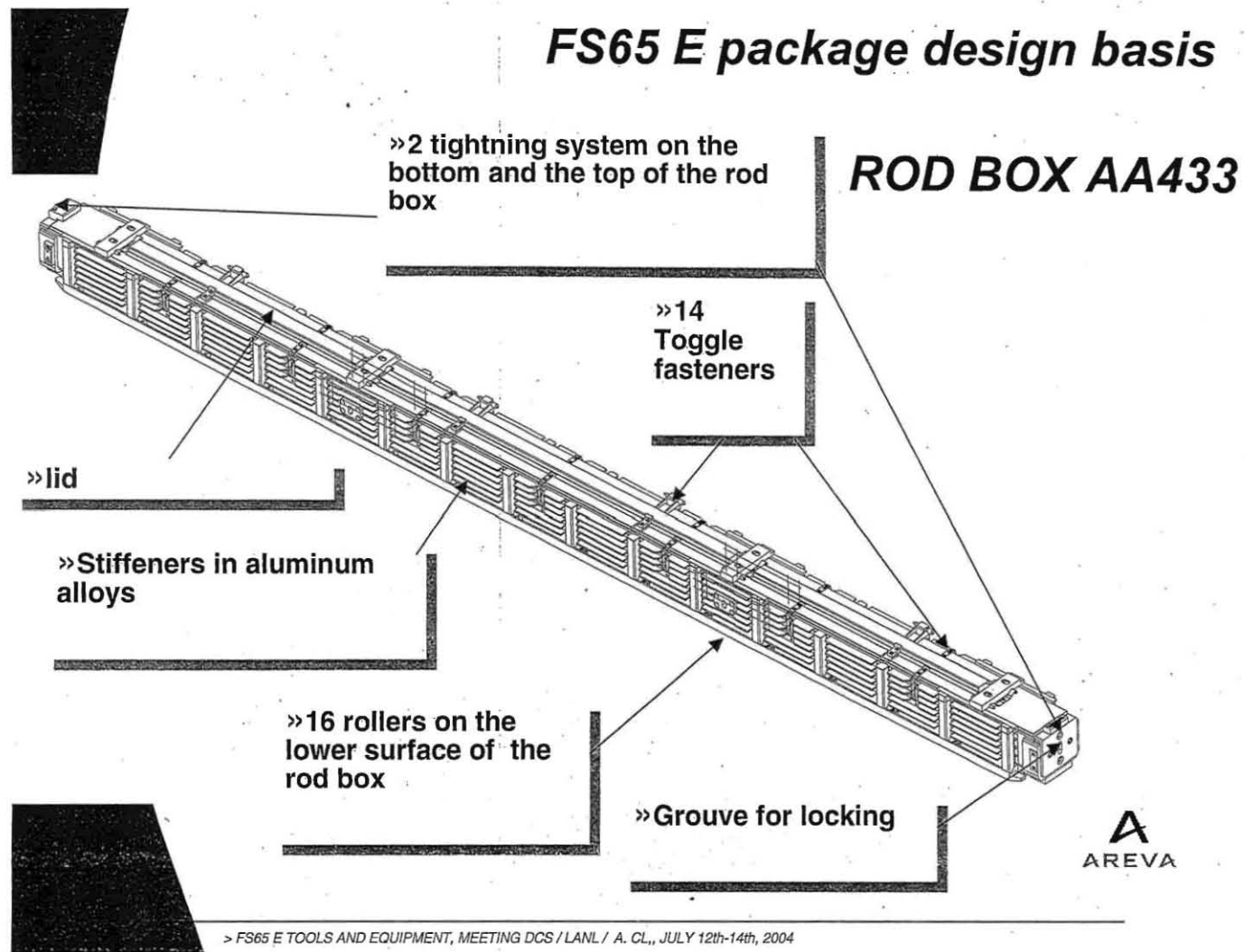


Figure 3, MOX Rod Box- Schematic



Figure 4, MOX Rod Box- Close-Up

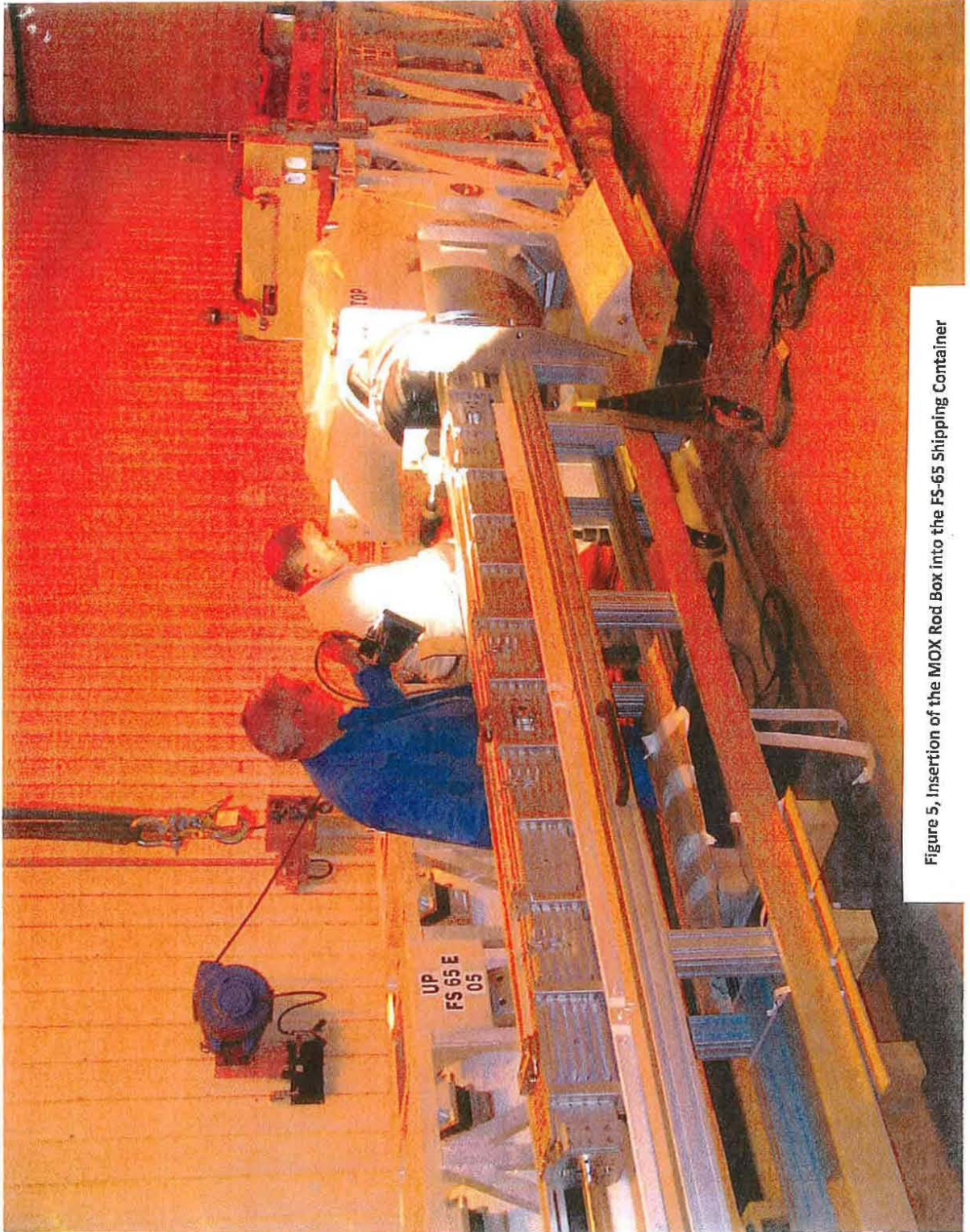


Figure 5, Insertion of the MOX Rod Box into the FS-65 Shipping Container



Figure 6, Insertion of the MOX Rod Box into the FS-65 Shipping Container- Close-Up

MOX FUEL ASSEMBLY FIGURES

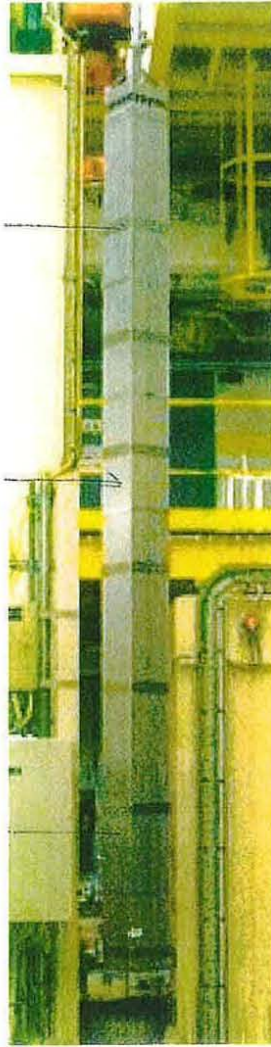


Figure 7, MOX Fuel Assembly

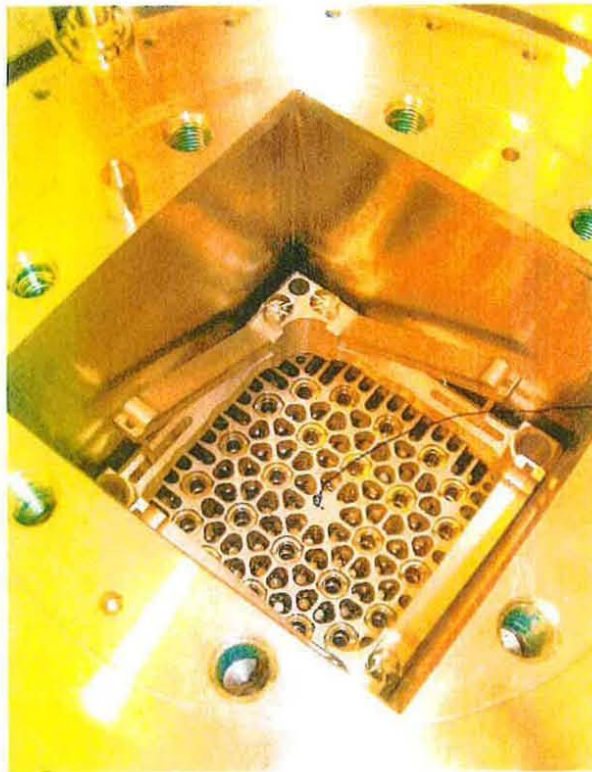


Figure 8, MOX Fuel Assembly Loaded into FS-65 Shipping Container

NAC-LWT SHIPPING CASK FIGURES

Cask received at site



Figure 9, NAC-LWT Cask Loaded into Shipping Container on Flatbed Trailer

ISO opened to expose impact limiters



Figure 10, Shipping Container Opened to Expose Impact Limiters on NAC-LWT Cask

Impact limiters are removed Cask support restraint is removed

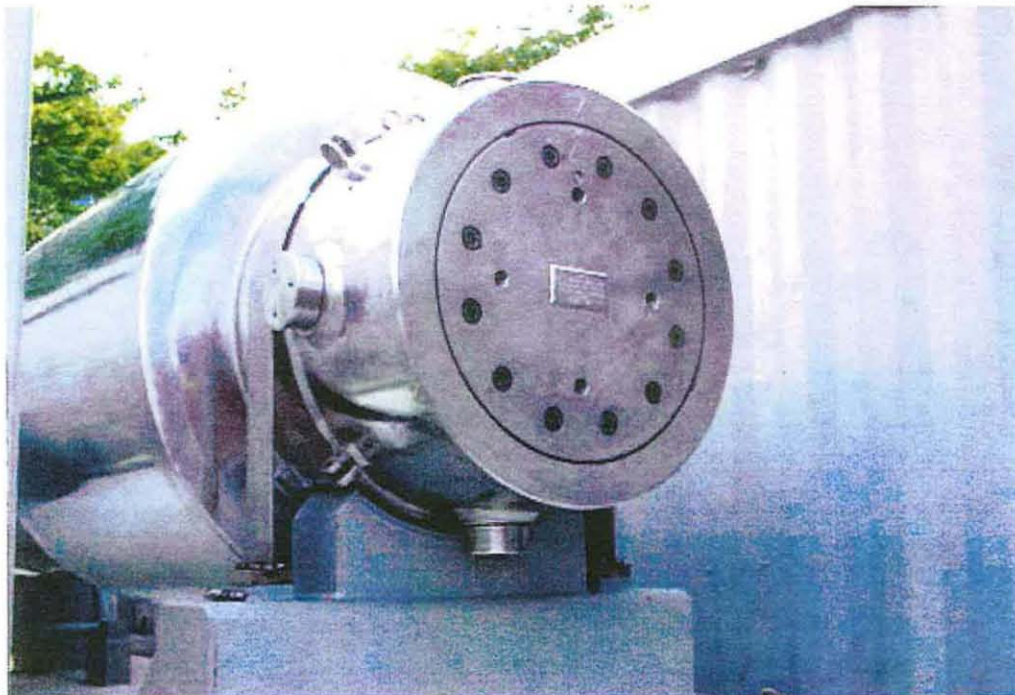


Figure 11, Impact Limiters and Cask Support Restraint Removed on NAC-LWT Cask

Cask is raised to vertical and is removed from ISO

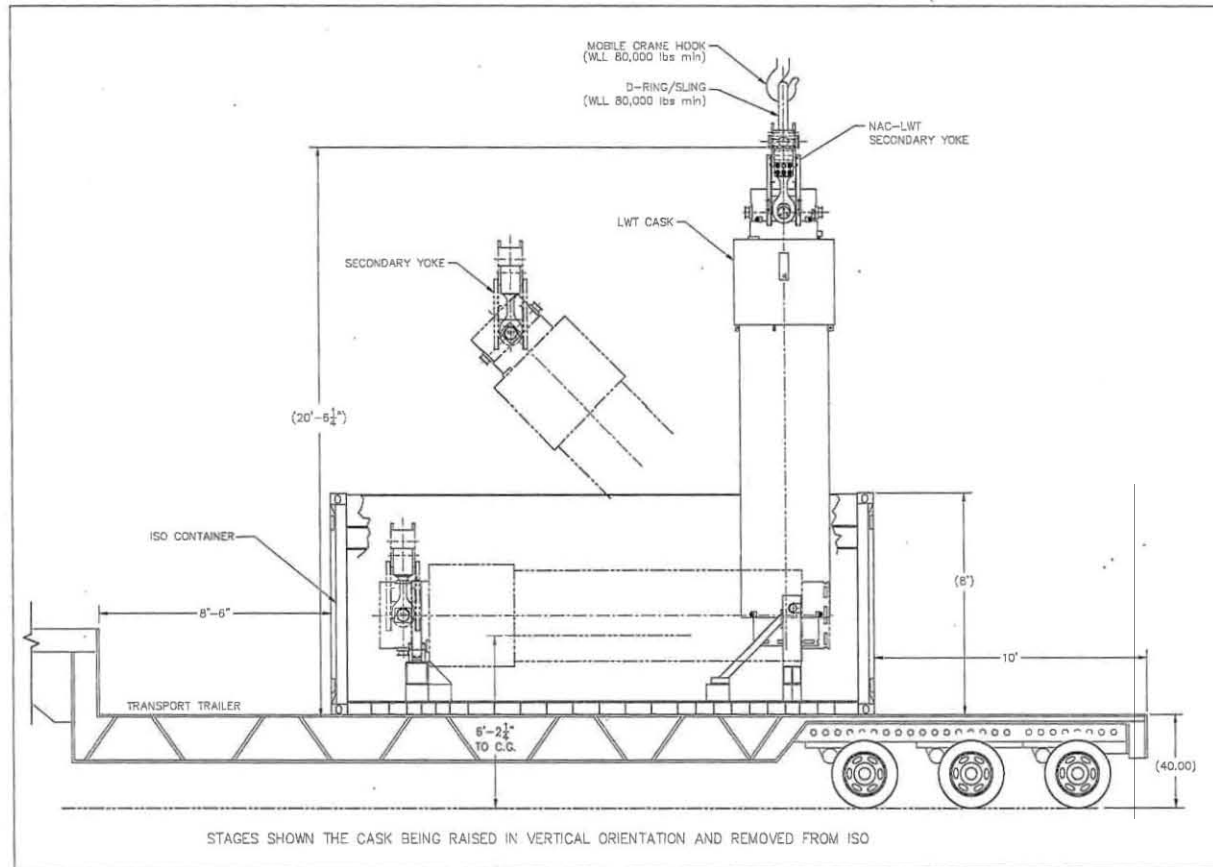


Figure 12, NAC-LWT Cask is Raised to Vertical and Removed from ISO- Schematic

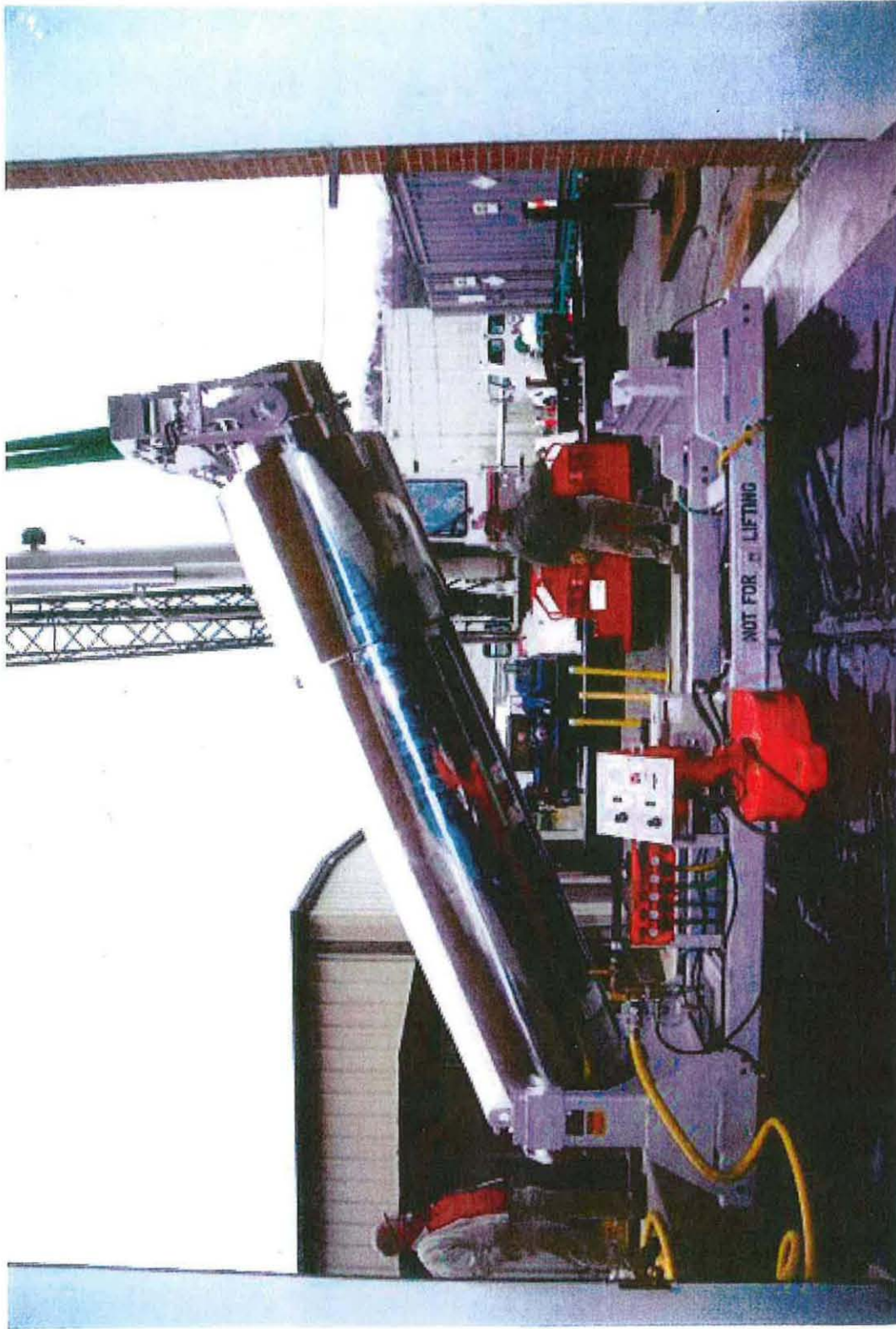
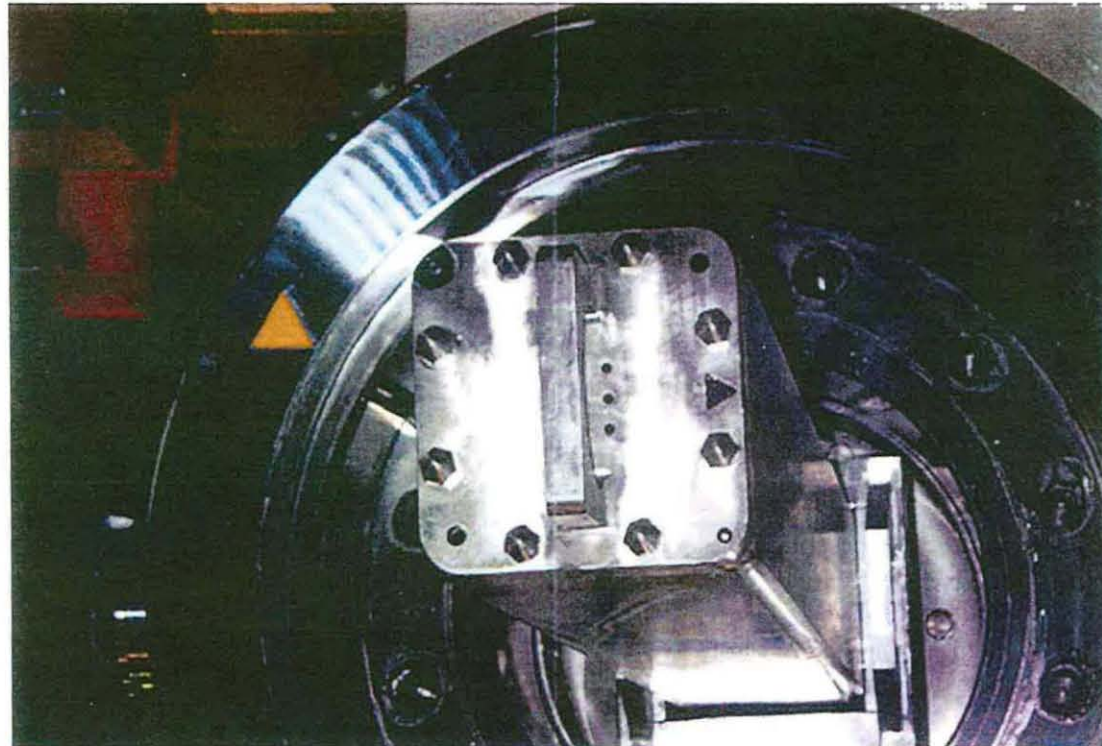


Figure 13, NAC-LWT Cask at ORNL

PWR insert and fuel canister loaded into cask



Canister is shown in photo higher than fully seated

~ 1,750 lbs

Figure 14, PWR Insert and Fuel Canister Loaded with NAC-LWT Cask

LWT Basics

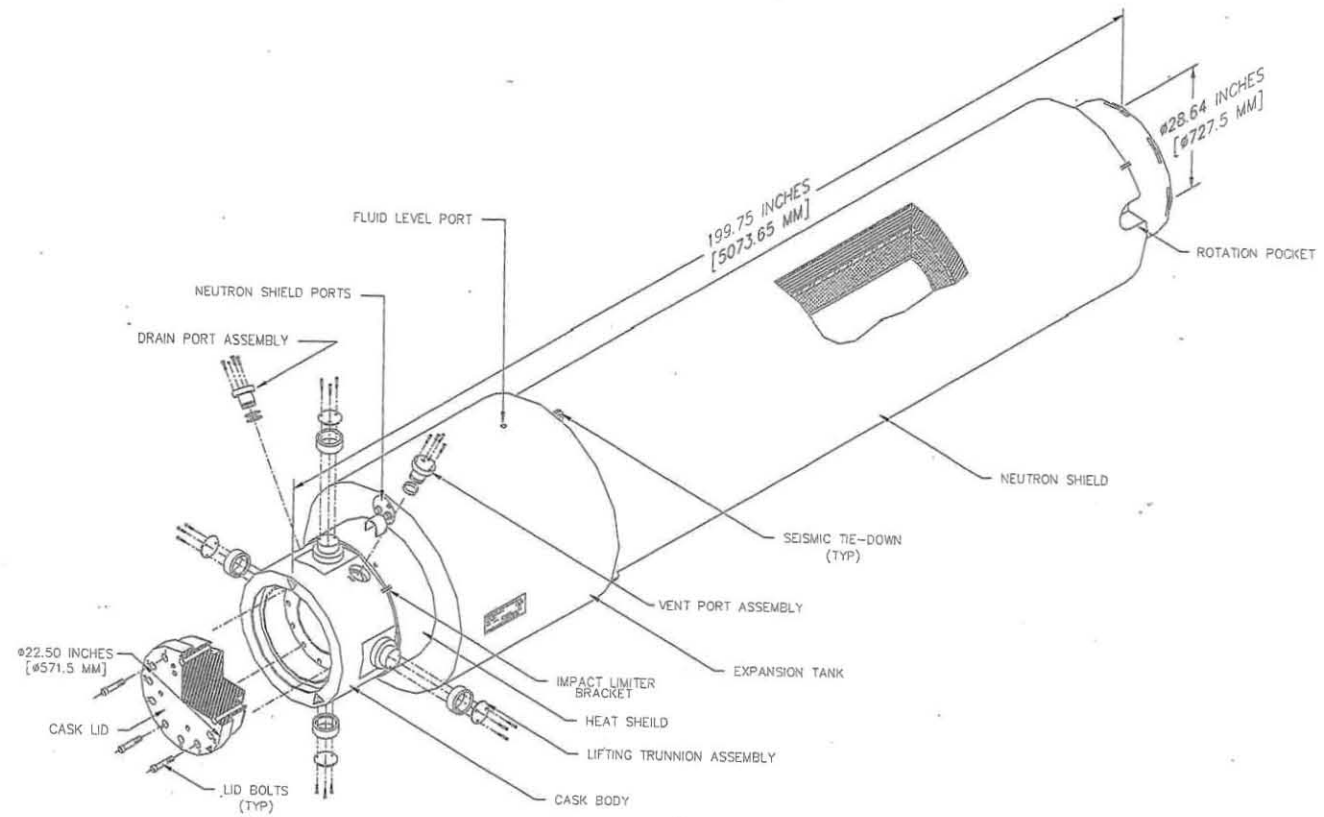


Figure 15, NAC-LWT Basics- Schematic

NAC-LWT General Description

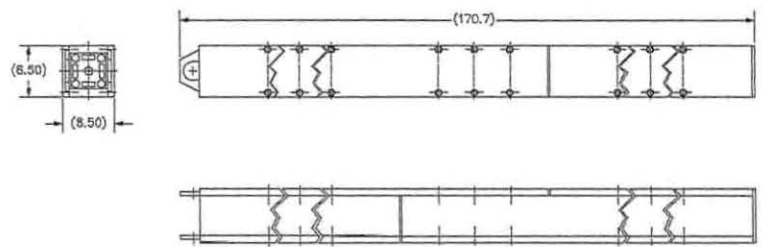
Dimensions	inch	mm
Overall length	199.80	5075
Overall diameter	44.20	1120
Cavity length	180.90	4600
Cavity diameter	13.37	340

Weight	tons	metric tons
Loaded with impact limiters inside the ISO	33.0	30.0
Empty Cask with impact limiters	24.0	22.4



Figure 16, NAC-LWT General Description

PWR Insert and PWR 5x5 Rod Canister



The photos show the PWR Insert and the PWR fuel rod canister. The insert provides a sleeve for the fuel rod canister, and will remain in the cask and will not have to be moved. The canister weighs 543 lbs.

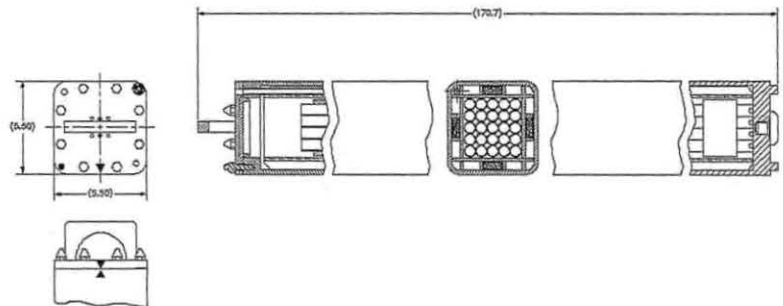


Figure 17, PWR Insert and PWR 5X5 Rod Canister- Schematic